APPENDIX G
LEVEL OF DEVELOPMENT SPECIFICATION TEMPLATE

DIGITAL GUIDANCE SUITE:
AOTEAROA | NEW ZEALAND 2023

CONSTRUCTION SECTOR ACCORD

BIM BETTER BUILDING PROCESS. BUILDING BETTER PERFORMANCE.

New Zealand Institute of Building

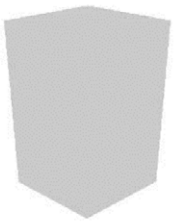
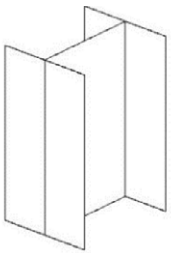
TABLE OF CONTENTS

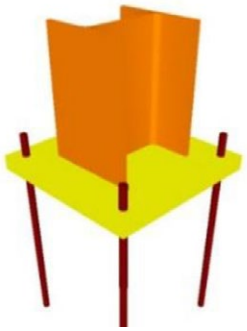
1— LEVEL OF DEVELOPMENT DEFINITIONS

A Model Element Author (MEA) is responsible for developing each Model Element at the end of each phase of a project to a minimum Level of Development (LOD) in accordance with the BIMForum Level of Development Specification December 2022.

A summary of LOD definitions and responsibilities is provided in the tables below. If there is conflict between the definitions in these tables and the BIMForum Level of Development Specification December 2022, the tables below take precedence.

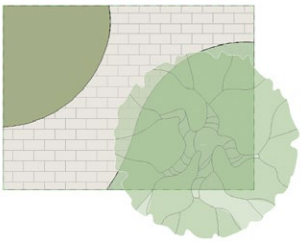
1.1 LOD DEFINITIONS FOR BUILDING STRUCTURE

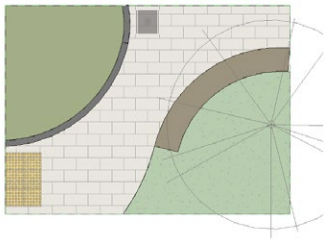
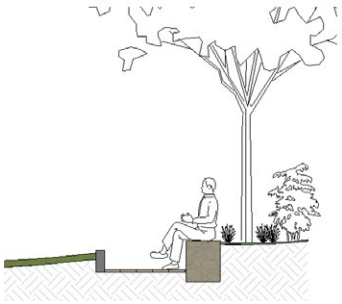
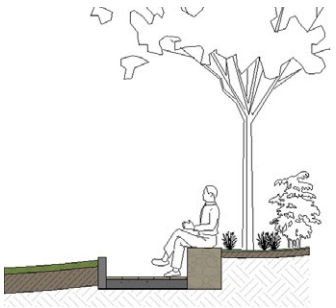
#	DESCRIPTION	EXAMPLE - STRUCTURAL COLUMN
LOD 100	The Model Element may be graphically represented in the Model with a symbol or other generic representation but does not satisfy the requirements for LOD 200. *Note: LOD 100 elements are not always geometric representations. Examples are information attached to other Model Elements and symbols showing the existence of components.*	**LOD 100** - 2D or 3D geometry, generic column element 
LOD 200	The Model Element is graphically represented within the Model as a generic system, object, or assembly with an approximate quantity, size, shape, location, and orientation. *Note: At this LOD elements are generic placeholders. They may be recognisable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.*	**LOD 200** - Generic 3D geometry, approximate size, shape and location 
LOD 300	The Model Element is graphically represented within the Model as a design-specified system, object, or assembly in terms of quantity, size, shape, location, and orientation. *Note: The quantity, size, shape, location, and orientation of the primary elements as designed that are shown on verified drawings at a scale of 1:50 or above can be measured directly from the model with reference to non-modelled information such as notes amd dimension call-outs.*	**LOD 300** – 3D design intent geometry, specific size, shape and location. 

#	DESCRIPTION	EXAMPLE - STRUCTURAL COLUMN
LOD 350	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location and orientation, and interfaces with other building systems. *Note: Parts necessary for coordination of the element with nearby or attached elements are modelled. These parts will include such items as supports and connections. The quantity, size, shape, location, and orientation of the primary elements as designed that are shown on verified drawings at a scale of 1:50 or above can be measured directly from the model with reference to non-modelled information such as notes and dimension call-outs.*	**LOD 350** - 3D actual design geometry, specific size, shape, location and interface with other elements. 
LOD 400	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. *Note: An LOD 400 element is modelled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modelled information such as notes or dimension call-outs.*	**LOD 400** - 3D fabrication geometry including member coping, end plates, washers, nuts, etc. 

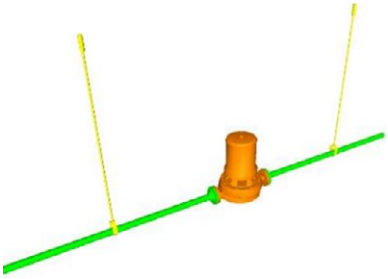
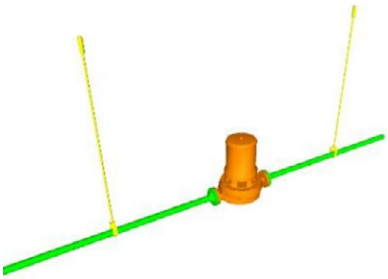
1.2 LOD DEFINITIONS FOR LANDSCAPE ARCHITECTURE

The role of a Landscape Architect overlaps many other disciplines, with Architects, Civil Engineers, Environmental consultants, Structural Engineers, Surveyors, and Arborists being a few. Much of the modelling for Landscape Architecture relies on information from other consultants to commence, and appropriate hold points become critical to the discipline's workflow.

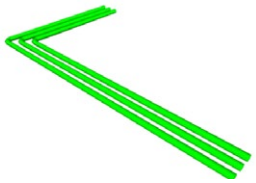
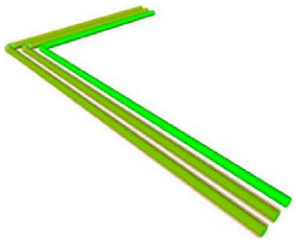
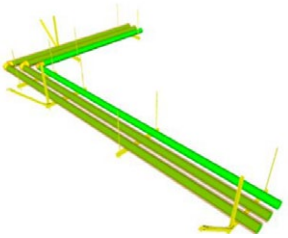
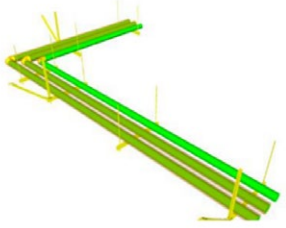
#	DESCRIPTION	EXAMPLE - LANDSCAPE
LOD 100	The Model Element may be graphically represented in the Model with a symbol or other generic representation but does not satisfy the requirements for LOD 200. *Note: LOD 100 elements often do not have geometric representations. Examples are information attached to other Model Elements and symbols showing the existence of components.*	**LOD 100** - 2D layout of design and geometry with 2D symbols as representation of elements. 

#	DESCRIPTION	EXAMPLE - LANDSCAPE
LOD 200	The Model Element is graphically represented within the Model as a generic system, object, or assembly with an approximate quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element. *Note: At this LOD, elements are generic placeholders. They may be recognisable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.*	**LOD 200** - Design intent is represented graphically and illustrated as flat areas. Landscape site elements such as trees, furniture, and landscape structures are generic placeholder elements in approximate locations. Any landscape architectural controlled fencing is shown as 2D linework. Existing trees are shown in approximate locations. 
LOD 300	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.	**LOD 300** – Design intent is shown as 3D elements that have depth and can be quantified. 3D solids are now defined in terms of different soft and hard landscape types and draped to terrain. Site furniture and landscape structural elements can be quantified. Landscape architecture discipline controlled fencing is modelled in basic forms with indicative footings. Proposed trees have accurate locations and the representations of tree canopy size and root ball are graphically shown. Tree-protection zones are illustrated as 2D linework. 
LOD 350	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems. Non-graphic information may also be attached to the Model Element.	**LOD 350** – 3D solids for hard and soft landscape now include material breakdown. Hard landscape is broken down into different types with associated indicative depths and build-ups. Planting types of all habits are now clearly defined through areas or elements. Root requirements and excavation pit allowances are reflected in the model. Site furniture and landscape structural elements are reflected as a modelled form with footing requirements indicative. 

1.3 LOD DEFINITIONS FOR BUILDING SERVICES

#	DESCRIPTION	EXAMPLE - SERVICES EQUIPMENTS
LOD 100	Diagrammatic or schematic Model Elements; conceptual and/or schematic layout/flow diagram; design performance parameters as defined in the BEP to be associated with model elements as non-graphic information.	**LOD 100** - Diagrammatic or schematic model elements.
LOD 200	Schematic model elements and layout with approximate size, shape, and location of equipment; approximate access and clearance requirements modelled. *Note: The external dimensions of ducts and pipework will be accurate in terms of design intent. The location of all services elements modelled to LOD 200 will be accurate to +/- 50mm where applicable at Detailed Design. Prior to detailed design the location will be approximate only.*	**LOD 200** - Schematic layout with approximate size, shape, and location (to +/-50mm where applicable at Detailed Design) of mains and risers 
LOD 300	Modelled as design-specified size, shape, spacing, and location of equipment; access/code clearance requirements are modelled.	**LOD 300** - 3D design intent geometry, specific size, shape and location. 
LOD 350	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems.	**LOD 350** - 3D actual design geometry, specific size, shape, location, and interface with other elements. 
LOD 400	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. *Note: An LOD 400 element is modelled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modelled information such as notes or dimension call-outs.*	**LOD 400** - 3D fabrication geometry including bracing, field installation components, etc. 

1.4 LOD DEFINITIONS FOR WATER

#	DESCRIPTION	EXAMPLE - WATER
LOD 100	Diagrammatic or schematic model elements; conceptual and/or schematic flow diagrams; design performance parameters as defined in the BEP to be associated with model elements as non-graphic information.	**LOD 100** - Diagrammatic or schematic model elements.
LOD 200	Schematic model elements and layout with approximate size, shape, and location (to +/-50mm) of equipment; approximate access and clearance requirements modelled. *Note: The external dimensions of pipework will be accurate in terms of design intent. The location of all water elements modelled to LOD 200 will be accurate to +/-50mm where applicable at Detailed Design. Prior to detailed design the location will be approximate only.*	**LOD 200** - Schematic layout with approximate size, shape, and location (to +/-50mm where applicable at Detailed Design) of mains and risers. 
LOD 300	Modelled as design-specified size, shape, spacing, and location of pipe and valves for risers, mains, and branches; approximate allowances for spacing and clearances required for all specified hangers, supports, vibration, and seismic control that are to be utilised in the layout of all risers, mains, and branches; access/code clearance requirements modelled.	**LOD 300** - Modelled as design-specified size, shape, spacing, and location of pipe and valves for risers, mains, and branches. 
LOD 350	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems.	**LOD 350** - 3D actual design geometry, specific size, shape, location, and interface with other elements. 
LOD 400	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. *Note: An LOD 400 element is modelled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modelled information such as notes or dimension call-outs.*	**LOD 400** - 3D fabrication geometry including bracing and field installation components. 

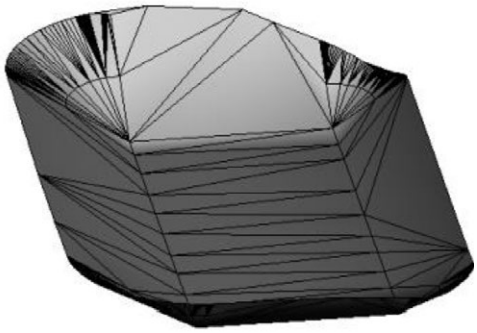
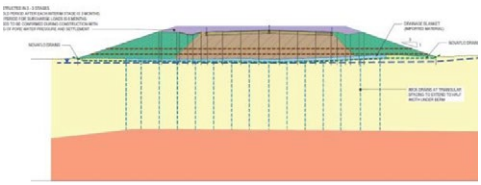
1.5 LOD DEFINITIONS FOR HV POWER

#	DESCRIPTION	EXAMPLE - POWER
LOD 100	The Model Element may be graphically represented in the Model with a symbol or other generic representation but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e. cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements. *Note: LOO 100 elements are not always geometric representations. Examples are information attached to other model elements and symbols showing the existence of components.* *Specific example: An LOD 100 CT is a generic cylindrical shape*	**LOD 100** - 2D or 3D geometry, generic CT element with cost/unit. 
LOD 200	The Model Element is graphically represented within the Model as a generic system, object, or assembly with an approximate quantity, size, shape, location, and orientation. *Note: At this LOO elements are generic placeholders. They may be recognisable as the components they represent, or they may be volumes for space reservation. Any information derived from LOO 200 elements must be considered approximate.* *Specific example: An LOD200 CT is a generic, recognisable shape.*	**LOD 200** - Generic 3D geometry, approximate size, shape, and location. 
LOD 300	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, and orientation. *Note: The quantity, size, shape, location, and orientation of the primary elements as designed that are shown on drawings at a scale of 1:50 or above can be measured directly from the model without referring to non-modelled information such as notes and dimension call-outs.* *Specific example: An LOD300 CT is a specific, recognisable shape. Terminals are modelled to support coordination with interfacing objects. Holes in the terminals are not modelled.*	**LOD 300** - 3D design intent geometry, specific size, shape, and location. 

#	DESCRIPTION	EXAMPLE - POWER
LOD 350	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other systems. *Note: Parts necessary for the coordination of the element with nearby or attached elements are modelled. These parts will include such items as supports and connections. The quantity, size, shape, location, and orientation of the primary elements as designed that are shown on drawings at a scale of 1:50 or above can be measured directly from the model without referring to non-modelled information such as notes and dimension call-outs.* *Specific example: An LOD350 CT is a specific, recognisable shape. Terminals are modelled to support coordination with interfacing objects. Holes in the terminals are also modelled. The additional detail shown in the insulator is optional.*	**LOD 350** - 3D design intent geometry, specific size, shape, and location. 
LOD 400	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. *Note: An LOD 400 element is modelled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modelled information such as notes and dimension call-outs.* *Specific example: An LOD400 CT is a specific, recognisable shape. Terminals are modelled to support coordination with interfacing objects. Holes in the terminals are also modelled, along with any nuts and bolts that are considered to be part of the CT assembly.*	**LOD 400** - 3D design intent geometry, specific size, shape, and location. 

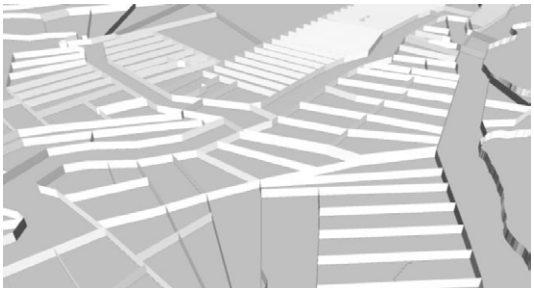
1.6 LOD DEFINITIONS FOR CIVIL

#	DESCRIPTION	EXAMPLE - EXISTING SUBSURFACE
LOD 100	The Model Element may be graphically represented in the Model with a symbol or other generic representation but does not satisfy the requirements for LOD 200. *Note: LOD 100 elements often do not have geometric representations. Examples are information attached to other model elements and symbols showing the existence of components.*	**LOD 100** - 22D and generic representation

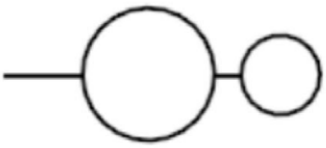
#	DESCRIPTION	EXAMPLE - EXISTING SUBSURFACE
LOD 200	The Model Element is graphically represented within the Model as generic with an approximate quantity, size, shape, location, depth, and orientation.	**LOD 200** - Sublayers are modelled as 3D triangulated surfaces or masses, e.g. top and bottom of soft soil.  
LOD 300	Not typically defined	**Not typically defined**
LOD 350	Not typically defined	**Not typically defined**
LOD 400	Not typically defined	**Not typically defined**

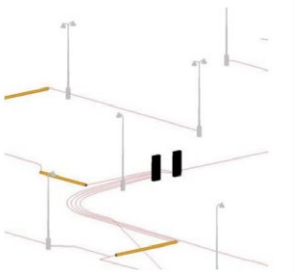
1.7 LOD DEFINITIONS FOR BOUNDARIES

#	DESCRIPTION	EXAMPLE - BOUNDARIES
LOD 100	The Model Element may be graphically represented in the Model with a symbol or other generic representation but does not satisfy the requirements for LOD 200. *Note: LOD 100 elements often do not have geometric representations. Examples are information attached to other model elements and symbols showing the existence of components.*	**LOD 100** - Boundaries and areas are modelled as lines and polygons.. 

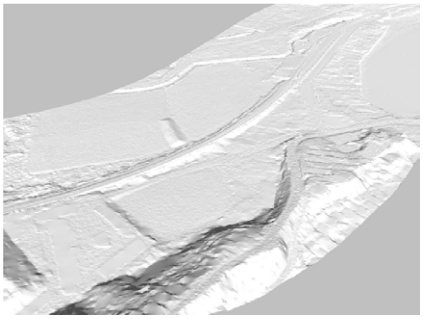
#	DESCRIPTION	EXAMPLE - BOUNDARIES
LOD 200	The Model Element is graphically represented within the Model as a generic object with accurate size, shape, location, depth, and orientation.	**LOD 200** - Boundaries and areas are modelled in 3D and draped to terrain. Boundaries are modelled in 3D, so they are visible in section view. 
LOD 300	Not typically defined	**Not typically defined**
LOD 350	Not typically defined	**Not typically defined**
LOD 400	Not typically defined	**Not typically defined**

1.8 LOD DEFINITIONS FOR LIGHTING

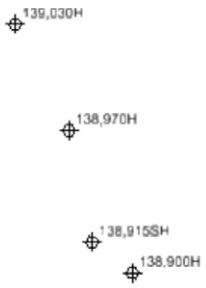
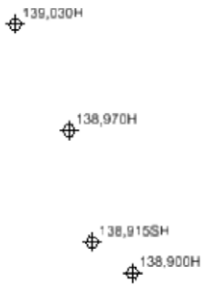
#	DESCRIPTION	EXAMPLE - LIGHTING
LOD 100	The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. *Note: LOD 100 elements often do not have geometric representations. Examples are information attached to other model elements and symbols showing the existence of components.*	**LOD 100** - 2D signature of lighting columns, bracket arms, luminaires, and cabinets. 2D lines of the ground cables and ducts. 
LOD 200	The Model Element is graphically represented within the Model as a generic system, object, or assembly with an approximate quantity, size, shape, location, depth, and orientation. *Note: At this LOD elements are generic placeholders. They may be recognisable as the components they represent or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.*	**LOD 200** - 3D model of the generic placeholder of the structure. 3D point of centre top of foundation for setting-out. 

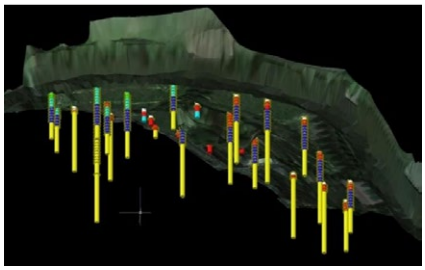
#	DESCRIPTION	EXAMPLE - LIGHTING
LOD 300	The Model Element is graphically represented within the Model as a design specified system, object, or assembly in terms of quantity, size, shape, location, and orientation.	**LOD 300** - 3D solids ("indicated shape and dimension") of lighting columns, bracket arms, luminaires, foundations, and cabinets. 
LOD 350	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems.	**LOD 350** - 3D solids ("correct shape and dimension") of lighting columns, bracket arms, luminaires, foundations, and cabinets. 
LOD 400	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information.	**LOD 400** - 3D fabrication geometry. 

1.9 LOD DEFINITIONS EXISTING TERRAIN

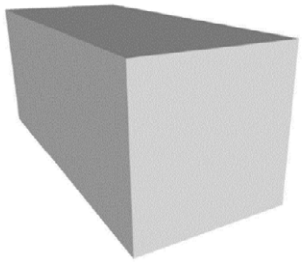
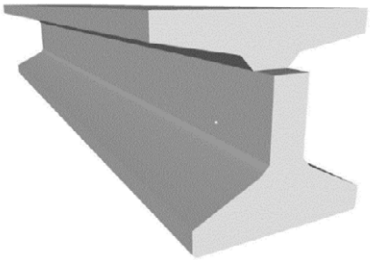
#	DESCRIPTION	EXAMPLE - EXISTING TERRAIN
LOD 100	Not typically defined	**Not typically defined**
LOD 200	The Model Element is graphically represented within the Model as a generic system, object, or assembly with an approximate quantity, size, shape, location, depth, and orientation.	**LOD 200** - 3D triangulated surface of existing terrain based on survey data. 
LOD 300	Not typically defined	**Not typically defined**
LOD 350	Not typically defined	**Not typically defined**
LOD 400	Not typically defined	**Not typically defined**

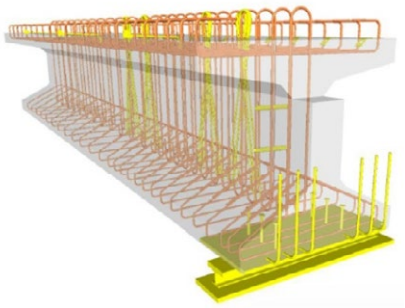
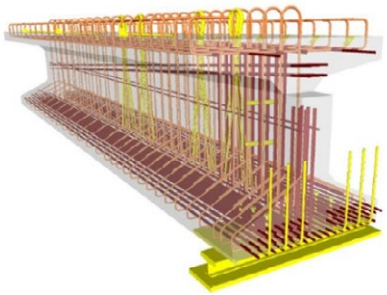
1.10 LOD DEFINITIONS FOR GEOTECHNICAL DRILLING

#	DESCRIPTION	EXAMPLE - GEOTECHNICAL DRILLING
LOD 100	The Model Element may be graphically represented in the Model with a symbol or other generic representation but does not satisfy the requirements for LOD 200. *Note: LOD 100 elements often do not have geometric representations. Examples are information attached to other model elements and symbols showing the existence of a component.*	**LOD 100** - Geotechnical drillings are drafted as 2D points. 
LOD 200	The Model Element is graphically represented within the Model as a generic system, object, or assembly with an approximate quantity, size, shape, location, depth, and orientation. *Note: At this LOD elements are generic placeholders. They may be recognisable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.*	**LOD 200** - Geotechnical drillings are modelled as 3D generic points. 

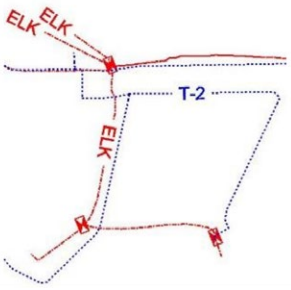
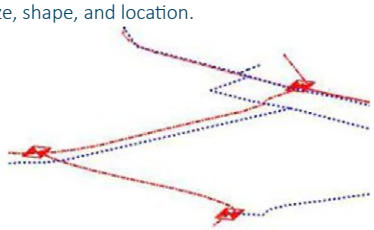
#	DESCRIPTION	EXAMPLE - GEOTECHNICAL DRILLING
LOD 300	The Model Element is graphically represented within the Model as a design-specified system, object, or assembly in terms of quantity, size, shape, location, and orientation.	**LOD 300** - Geotechnical drillings are modelled as 3D cylinders with layers of substructure. 
LOD350	Not typically defined	**Not typically defined**
LOD400	Not typically defined	**Not typically defined**

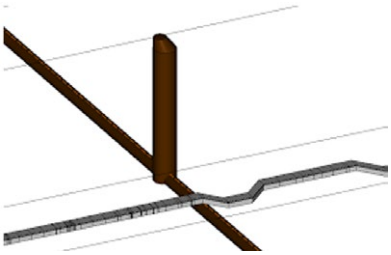
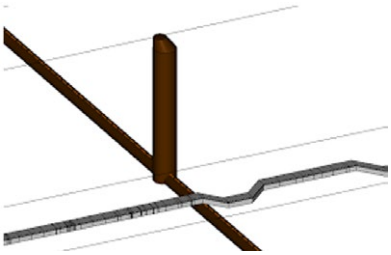
1.11 LOD DEFINITIONS FOR CIVIL STRUCTURAL ELEMENTS

#	DESCRIPTION	EXAMPLE - STRUCTURAL (CONCRETE I GIRDER BRIDGE)
LOD 100	The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. *Note: LOD 100 elements often do not have geometric representations. Examples are information attached to other model elements and symbols showing the existence of a component.*	**LOD 100** - 2D or 3D geometry, generic element.
LOD 200	The Model Element is graphically represented within the Model as a generic system, object, or assembly with approximate quantity, size, shape, location, depth, and orientation. *Note: At this LOD elements are generic placeholders. They may be recognisable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.*	**LOD 200** - Generic 3D geometry with approximate size, shape, and location. 
LOD 300	The Model Element is graphically represented within the Model as a design-specified system, object, or assembly in terms of quantity, size, shape, location, and orientation. *Note: At LOD 300 main concrete structural members modelled per defined structural grid with the correct orientation. All sloping surfaces will be included in the Model Element except for elements affected by manufacturer selection.*	**LOD 300** - Generic 3D geometry with approximate size, shape, and location. 

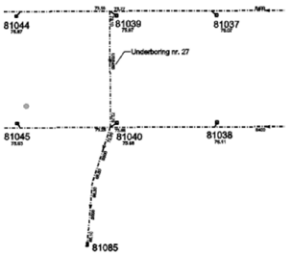
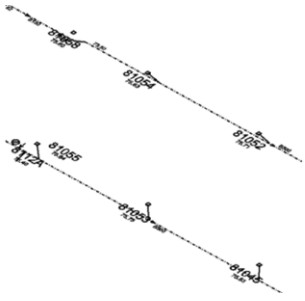
#	DESCRIPTION	EXAMPLE - STRUCTURAL (CONCRETE I GIRDER BRIDGE)
LOD 350	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems. *Note: Parts necessary for coordination of the element with nearby or attached elements are modelled. Element modelling to include reinforcing post-tension profiles and strand locations, reinforcement only in congested areas, chamfer, pour joints and sequences to help identify reinforcing lap splice locations, expansion joints, lifting devices, embeds and anchor rods, penetrations for items such as MEP and any permanent forming or shoring components.*	**LOD 350** - 3D actual design geometry with specific size, shape, and location plus interface with other elements. 
LOD 400	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. *Note: An LOD 400 element is modelled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modelled information such as notes and dimension callouts. All reinforcement including post-tension elements detailed and modelled at LOD 400.*	**LOD 400** - 3D fabrication geometry 

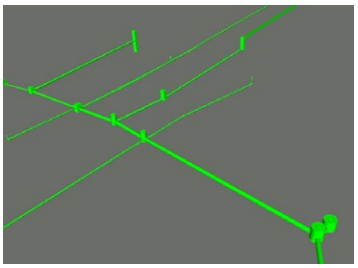
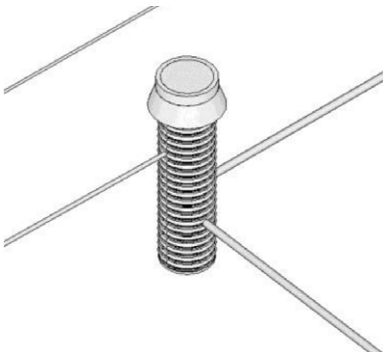
1.12 LOD DEFINITIONS FOR UNDERGROUND UTILITIES

#	DESCRIPTION	EXAMPLE - UTILITIES EQUIPMENT
LOD 100	Diagrammatic or schematic 2D elements; conceptual and/or schematic layout/flow diagram.	**LOD 100** – 2D diagrammatic or schematic elements. 
LOD 200	Schematic Model Elements and layout with approximate size, shape, and location of equipment; approximate access and clearance requirements modelled.	**LOD 200** - 3D diagrammatic or schematic elements with approximate size, shape, and location. 

#	DESCRIPTION	EXAMPLE - UTILITIES EQUIPMENT
LOD 300	Modelled as design-specified size, shape, spacing, and location of equipment; approximate allowances for spacing and clearances required for all specified anchors, supports, and vibration and seismic control that are utilised in the layout of equipment; access/ code clearance requirements modelled.	**LOD 300** - 3D design intent geometry with specific size, shape, and location. 
LOD 300	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other systems. *Note: Parts necessary for coordination of the element with nearby or attached elements are modelled.*	**LOD 300** - 3D actual design geometry with specific size, shape, location plus interface with other elements. 
LOD 400	Not typically defined	**Not typically defined**

1.13 LOD DEFINITIONS FOR STORMWATER

#	DESCRIPTION	EXAMPLE - UTILITIES EQUIPMENT
LOD 100	Diagrammatic or schematic 2D elements; conceptual and/or schematic flow diagrams.	**LOD 100** - 2D diagrammatic or schematic elements. 
LOD 200	Schematic Model Elements and layout with approximate size, shape, and location of equipment; approximate access and clearance requirements modelled.	**LOD 200** - 3D diagrammatic or schematic elements with approximate size, shape, and location. 

#	DESCRIPTION	EXAMPLE - UTILITIES EQUIPMENT
LOD 300	Modelled as **design-specified** size, shape, spacing, and location of pipe and valves for risers, mains, and branches; approximate allowances for spacing and clearances required for all specified hangers, supports, and vibration and seismic control that are to be utilised in the layout of all risers, mains, and branches; access/ code clearance requirements modelled.	**LOD 300** - 3D design intent geometry with specific size, shape, and location. 
LOD 350	Modelled as **actual construction** elements; actual size, shape, spacing, and locations/ connections of pipe and valves for risers, mains, and branches; actual size, shape, spacing, and clearances required for all hangers, supports, and vibration and seismic control that are utilised in the layout of all risers, mains, and branches; actual floor and wall penetration elements modelled. actual access/code clearance requirements modelled.	**LOD 350** - 3D actual design geometry, specific size, shape, location, and interface with other elements. 
LOD 400	Supplementary components added to the model required for fabrication and field installation.	**LOD 400** – 3D fabrication geometry including bracing and field installation components. 

2— LEVEL OF DEVELOPMENT FOR BUILDINGS

2.1 MODEL ELEMENT AUTHOR SCHEDULE

The following table assigns responsibilities to Model Elements via an Author and defines the minimum required LOD for Model Elements across the project stages.

Note: If there are two or more disciplines in the MEA Column, the first is the primary owner of the element and the second/third is required to coordinate with the first.

Model Element Author Key for Buildings			
Architectural Consultant	ARC	Process Consultant	PCS
Structural Consultant	STR	Topographic Survey Consultant	TS
HVAC & Mechanical Consultant	MEC	Security Consultant	SEC
Electrical Consultant	ELE	Medical Gas Consultant	MED
Plumbing & Drainage consultant	PLU	Audio Visual Consultant	AUD
Fire Consultant	FIR	Passive Fire Protection Consultant	PAS
Civil Consultant	CIV	Information Technology Services Consultant	ITS
Geotechnical Consultant	GEO	Contractor/Sub-contractor	CON
Landscape Architecture Consultant	LSP	Building Services Seismic Restraints	BSR
Nurse Call Consultant	NCS		

LOD for Buildings	
100	Conceptual
200	Approximate Geometry
300	Design Specified Geometry
350	Interface Coordination
400	Fabrication and Assembly
FV	Field Verified

2.2 MODEL ELEMENT AUTHOR & LEVEL OF DEVELOPMENT SCHEDULE FOR BUILDINGS

Spatial-related elements such as site boundaries, grids, levels, zones, and spaces are not assigned LODs because they are not technically elements that are modelled in three dimensions. There is a requirement to show them in the table below to make sure that they are assigned MEAs.

The LODs indicated below are minimum requirements by the end of each of the design and construction phases noted, the design and/or construction team may choose to implement a higher LOD. It should be noted that it is essential for the following disciplines to achieve the same LOD for a common end-of-stage deadline, then early completion of prior modelling to the required accuracy and certainty. For example, to achieve coordinated LOD 300 diffuser locations for the end of detailed design, accurately modelled ceiling grids will be required for the beginning of the detailed design stage.

2.3 MEA TABLE FOR BUILDING PROJECTS

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
SPATIAL														
Site boundaries, setbacks	-	-	TS	FV	TS	FV	TS	FV	CON	FV				To be coordinated between MEA and other design teams during concept design and to be finalised max during first two weeks of prelim design.
Grids	ARC	-	ARC	-	ARC	-	ARC	-	CON	-				Critical set-out information. To be coordinated between MEA and other design teams during concept design and to be finalised max during first two weeks of prelim design.
Levels (FFL)	ARC	-	ARC	-	ARC	-	ARC	-	CON	-				
Levels (SSL)	STR	-	STR	-	STR	-	STR	-	CON	-				
Slab Set-Out Planes	ARC	-	ARC	-	ARC	-	ARC	-	CON	-				
Roof Set-Out Planes (incl. pitch points)	ARC	-	ARC	-	ARC	-	ARC	-	CON	-				
Process Levels	PCS	-	PCS	-	PCS	-	PCS	-	CON	-				To be coordinated between MEA and other design teams during concept design and to be finalised max during first two weeks of prelim design.
Process zones	PCS	-	PCS	-	PCS	-	PCS	-	CON	-				
Process spaces, rooms	PCS	-	PCS	-	PCS	-	PCS	-	CON	-				
ARC Spaces, rooms	ARC	-	ARC	-	ARC	-	ARC	-	CON	-				
ARC zones	ARC	-	ARC	-	ARC	-	ARC	-	CON	-				

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
SITE														
Topography – Existing	CIV	-	CIV	200	CIV	200	CIV	200	CON	-				Existing ground surface to be provided, ideally in 3D.
Topography – Proposed	CIV	-	CIV	100	CIV	200	CIV	300	CON	-				
Site Services – Existing	CIV	-	CIV	200	CIV	200	CIV	200	CON	-				
Services (In Ground) – Proposed	CIV	-	CIV	100	CIV	300	CIV	300	CON	-				Greater than 1m from the building.
Excavation	CIV	-	CIV	200	CIV	200	CIV	200	CON	-				
Site Water, Stormwater, Sewer	CIV	-	CIV	200	CIV	300	CIV	300	CON	-				Greater than 1m from the building.
External and in-ground tanks and pipework	CIV	-	CIV	100	CIV	300	CIV	300	CON	-				In conjunction with advice from relevant services disciplines.
Surface finishes	CIV	-	CIV	100	CIV	200	CIV	300	CON	-				
Site Power	ELE	-	ELE	100	ELE	200	ELE	300	CON	-				
Site Communications	ELE	-	ELE	100	ELE	200	ELE	300	CON	-				
Site Lighting	ELE	-	ELE	100	ELE	200	ELE	300	CON	-				
Site Furniture (fences, gates, etc.)	LSP	-	LSP	100	LSP	200	LSP	200	CON	-				
Site Landscaping	LSP	-	LSP	200	LSP	200	LSP	200	CON	-				Subject to appointed scope.

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
ROADING														
Parking	ARC	100	CIV	200	CIV	300	CIV	300	CON	-				
Pavement	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Curbs	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Retaining walls	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Noise walls	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Barriers	CIV	-	CIV	200	CIV	300	CIV	300	CON	-				
Signage	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Road Lighting	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Traffic Signals	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Road Furniture	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Corridor Fencing	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Environmental and Cultural Heritage Protection Measures	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Earthworks Surface	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Road Surface	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				
Alignment Geometry	CIV	100	CIV	200	CIV	300	CIV	300	CON	-				

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
PROCESS														
Plant – Existing	PCS	-	PCS	100	PCS	200	PCS	200	CON	-				
Plant – New	PCS	-	PCS	100	PCS	200	PCS	300	CON	-				
Plant – Vendor Supply	PCS	-	PCS	100	PCS	200	PCS	350	CON	400				
Plant – Foundations	PCS	-	PCS	100	STR	200	STR	300	CON	-				
Plant Ground improvements	GEO	-	GEO	100	STR	200	STR	300	CON	-				
Pipework	PCS	-	PCS	100	PCS	200	STR	300	CON	-				
Pipework Supports	PCS	-	PCS	100	STR	200	STR	300	CON	-				
Pipework fittings, valves, sensors	PCS	-	PCS	100	PCS	200	PCS	300	CON	-				
Piping underground encasements	PCS	-	PCS	100	STR	200	STR	300	CON	-				
Plant access structures	PCS	-	PCS	100	STR	200	STR	300	CON	-				
Plant handrailing and gates	PCS	-	PCS	100	STR	200	STR	300	CON	-				

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN			PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**		**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
FOUNDATIONS															**Waterproofing, taking, sealants to ARC detail**
Piles (Timber, Steel and Concrete)	S	A	100	STR	200	STR	300	STR	300						Refer 2D drawings for pile lengths and details. Pile length dependent on soil conditions and thus at risk of changing after commencement of construction.
Proprietary piles (Screw Piles etc)	S	A	100	STR	200	STR	200	STR	200						Modelled indicatively only.
Pile caps	S	A	100	STR	200	STR	300	STR	300						
Pad Footing/Ground Beam/Strip Footing	S	A	100	STR	200	STR	300	STR	300						
Lift Pit Foundation/Sumps/ Foundation Rafts	A	S	100	A	S	200	S	A	300	STR	300				Structural will model structural component, all setout and detail information by **ARC**. LOD 200 max where lift procurement not finalised before end of Detailed Design.
Ground Retention	A	S	C	100	STR	200	STR	300	STR	300					Where using proprietary retention systems LOD 200 max.

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
FLOORING - STRUCTURAL														**Reinforcement, saw cuts, construction joints not modelled – shown in 2D.**
Slab-on-Grade/Rafts	A S	100	A S	200	S A	300	S A	300						
Suspended Floors – Timber/ Concrete/Proprietary (Comflor, Traydek, Double T, Hollow Core, Flat Slab)	A S	100	A S	200	S A	300	S A	300						Floor zone modelled. Floor profile typically not modelled.
Zones where post-pour slab coring is NOT permitted.	STR	100	STR	200	STR	300	STR	300						Zones where post pour slab coring is NOT permitted to be highlighted on drawings and in the model.
Ramps (Access ramps etc)	ARC	100	A S	200	A S	300	A S	300						
Slab Set Downs/Steps	-	-	ARC	100	A S	200	A S	300						Slab setdown depths to be defined at beginning of Developed Design to avoid impact on support beams.
Pits/Trenches	-	-	ARC	100	A M S	200	A M S	300						
Nibs – Structural	-	-	-	-	A S	200	S A	300						Nibs not covered by standard drawings to be modelled as agreed. Setout by **ARC**.

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN			PRELIM. DESIGN			DEVELOPED DESIGN			DETAILED DESIGN			CONSTRUCTION			HANDOVER			COMMENTS
Model Element	**MEA**		**LOD**	**MEA**		**LOD**	**MEA**		**LOD**	**MEA**		**LOD**	**MEA**	**LOD**		**MEA**	**LOD**	**Field Verification**	
FLOORING - NON-STRUCTURAL																			
In situ Screed	-		-	ARC		100	ARC		200	ARC		300							Not modelled in STR model but allowances in STR flooring made with any required steps shown.
Nibs, kerbs, plinths, upstands	-		-	ARC		100	ARC		200	ARC		300							Not modelled in structural model. Reinforcing shown on engineering 2D details/standard drawings. Setout by ARC.
WALLS - LOADBEARING																			
Concrete – In situ	A	S	100	A	S	200	A	S	300	A	S	300							
Concrete – Precast	A	S	100	A	S	200	A	S	300	A	S	300							STR to dimension max/min dimensions. Final setout by ARC.
Masonry	A	S	100	A	S	200	A	S	300	A	S	300							STR to model loadbearing walls only (non-loadbearing and 90 series walls be modelled by ARC.
Timber Framing	A	S	100	A	S	200	A	S	300	A	S	300							If within bound/scope of NZS3604 – ARC to design and draw. Outside limits of NZS3604 – ARC to draw. Engineer to provide size and detail on 2D drawings.
Mass Timber	A	S	100	A	S	200	A	S	300	A	S	300							
Proprietary Structural Insulated Panels	A	S	100	A	S	200	A	S	300	A	S	300							

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
WALLS - NON-LOADBEARING														**STR can model in later stage; however, setout is by ARC and this is to be frozen at start of Detailed Design.**
Concrete – Precast Cladding/ Façade	ARC	100	ARC	100	A S	200	A S	300						Reinforcement, construction joints not modelled – shown in 2D.
Masonry	ARC	100	ARC	100	A S	200	A S	300						STR to dimension max/min dimensions. Final setout by ARC.
Timber Framing	ARC	100	ARC	100	ARC	200	ARC	300						If within bound/scope of NZS3604 – ARC to design and draw. Outside limits of NZS3604 – ARC to draw. STR to provide size and detail on 2D drawings.
Brickwork	ARC	100	ARC	100	ARC	200	ARC	300						
PRIMARY - CONNECTIONS														**Complex Connections Can Be Modelled to LOD 300 Where Agreed, Not All Connections Require Modelling.**
Baseplates		-		-		-	STR	100						Coordination mass to be modelled.
Intrusive Connections (Moment Frame Collars/Gussets/BRB ends)		-	STR	100	STR	200	STR	300						Proprietary product connections to be considered LOD 200 until product confirmation.
Castin Plates		-		-	STR	100	STR	200						

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
STEELWORK - PRIMARY														**All structure supporting and bracing floors/roofs. Setout to be frozen at beginning of Developed Design.**
Beams	A M S	100	S M	200	A S	300	STR	300						For all penetrations through beams refer Penetration section below.
Columns	A S	100	STR	200	STR	300	STR	300						
Trusses	A M S	100	A S	200	STR	300	STR	300						
Brace Frames (EBF, CBF)	S A	100	STR	200	STR	200	STR	300						Associated flybraces to be modelled.
Proprietary Brace Frames (BRB etc)	S A	100	STR	200	STR	200	STR	200						Proprietary element and end connections by supplier. Can only be modelled to LOD 200 prior to final supplier design.
Roof bracing (EA, Flat etc)	S A	100	S A	200	STR	200	STR	300						Roof plane to be frozen before structural modelling commences.

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
STEELWORK - SECONDARY														
Beams	-	-	A M S	100	S M	200	STR	300						For all penetrations through beams, refer Penetration section below.
Columns	-	-	A S	100	STR	200	STR	300						
Purlins	-	-	ARC	100	A S	200	A S	200						Roof plane to be frozen before structural modelling commences. Size and spacing will be defined, final setout by **ARC** (to suit gutter/ridgeline details).
Girts	-	-	ARC	100	A S	200	A S	200						Wall setout plane to be frozen before modelling commences. Size and spacing will be defined, final setout by **ARC**.
Façade – Lightweight		-	S A	100	S A	200	STR	300						Primary support lines must be agreed in Preliminary Design and frozen at Developed Design. Typically these are horizontal support lines at floor level (often the slab edge) with additional horizontal support lines to support large windows and doors. LOD 200 max when support lines not frozen, final setout to be by **ARC**.
Façade – Curtainwall	-	-	S A	100	S A	200	STR	300						
Fly Bracing – Façade Supports	-	-	S A	100	S A	100	STR	100						Where agreed coordination mass to be modelled.
Fly Bracing – Roof	-	-	-	-	STR	100	STR	100						
Fly Bracing – Beam Supports	-	-	-	-	STR	100	STR	100						
Fly Bracing – Wall head restraints and ceiling supports	-	-	-	-	STR	100	STR	100						
Lift Columns and Framing	-	-	A S	100	S A	200	STR	300						LOD 200 max where lift procurement not finalised before end of Detailed Design.

MEA Table for Building Projects

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Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
STEELWORK - SECONDARY														
Lift Rail Supports and Lifting Beams	-	-	-	-	S A	-	STR	200						Accurate geometry, setout by lift consultant.
Stair Columns and Framing	-	-	A S	100	S A	200	STR	300						Not including stringers (see stair section).
Support frames carrying significant loads (>1000kg). Defined setout	-	-	A S	100	S A	200	STR	300						Where setout can be frozen at the beginning of Developed Design.
Support frames carrying significant loads (>1000kg). Setout reliant on architecture	-	-	A S	100	S A	200	S A	200						Where setout is determined by an architectural element (wall/ceiling/ cladding/feature etc). Final setout to be by **ARC**.
Plant Platforms			M S	100	M S	200	STR	300						LOD 200 max where proprietary product procurement not finalised before end of Detailed Design.
Parapets			ARC	100	A S	200	S A	300						
Canopies			ARC	100	A S	200	S A	300						
Operable Wall Supports			ARC	100	A S	200	STR	300						
Engineered Ceilings and Bulkheads			ARC	100	A S	200	STR	300						
Fixed Internal Walls, Doors/ Windows Supports			ARC	100	A S	200	STR	300						When outside of NZS3604 scope, project specific, needs to be agreed. LOD 200 max where proprietary product procurement not finalised before end of Detailed Design.
Monorails/Hoists/Medical pendants			ARC	100	A S	200	S A	300						

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STEELWORK - TERTIARY														
Fixed Internal Walls, Doors/ Windows Supports	-	-	ARC	100	ARC	200	ARC	300						**ARC** to design and draw.
Balustrade Systems	-	-	ARC	100	ARC	200	ARC	300						Not modelled structurally, structural typical details provided. (For steel floor beam and steel stringer supporting Balustrade systems, refer steelwork secondary and stairs.)
Support frames carrying between 100kg and 1000kg	-	-	-	-	ARC	100	ARC	200						**ARC** to draw. Engineer to provide size and detail.
Support frames carrying <100kg	-	-	-	-	ARC	100	ARC	200						**ARC** to design and draw.
Light Metal Framing (Studs, top hats, ceiling framing etc.)		-	ARC	100	ARC	200	ARC	300						**ARC** to design and draw.
CONCRETE - PRIMARY														
Beams	A S	100	S M	200	S M	300	STR	300						Reinforcement, saw cuts, construction joints not modelled – shown in 2D.
Columns	A S	100	STR	200	STR	300	STR	300						Reinforcement, saw cuts, construction joints not modelled – shown in 2D.

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ENGINEERED TIMBER - PRIMARY														**All STR supporting and bracing floors/roofs. Setout to be frozen at beginning of Developed Design.**
Beams	A S	-	S M	100	S M	200	STR	300						For all penetrations through beams refer Penetration section below.
Columns	A S	-	STR	100	STR	200	STR	300						
Trusses	A S	-	A S	100	STR	200	STR	200						LOD 200 max where proprietary truss system specified.
Brace Frames	A S	-	A S	100	STR	200	STR	200						
TIMBER - SECONDARY														**ARC to draw. When outside NZ604 STR to provide size and detail. May not be modelled by STR**
Beams	-	-	ARC	100	A S	200	A S	300						
Columns	-	-	ARC	100	A S	200	A S	300						
Floor Joists/Panels	-	-	ARC	100	A S	200	A S	200						

MEA Table for Building Projects

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STAIRS														**Stair flights to be dimensioned by ARC**
Precast Stairs (Tread + Throat)	ARC	100	A S	100	A S	300	A S	300						
Concrete Insitu Stairs (Tread + Throat)	ARC	100	A S	100	A S	300	A S	300						
Steel Stair Treads	ARC	100	A S	100	A S	300	A S	300						
Steel Stringers	-	-	-	-	A S	200	A S	300						Where setout can be frozen at the beginning of Developed Design.
Engineered Timber Stairs (CLT, LVL etc)	ARC	100	ARC	100	A S	200	A S	300						STR will model structural component, all setout and detail information by ARC.
Timber Stairs (Treads + Stringers)	ARC	100	ARC	100	ARC	200	ARC	300						If within bound/scope of NZS3604 – ARC to design and draw.

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PENETRATIONS														**All penetrations in STR elements that require specific details (greater than 150mm diameter or width for concrete elements and greater than 50mm for steel elements) need to be added in STR model. Typical penetrations in STR elements (less than 149mm diameter or width for concrete elements and less than 49mm for steel elements) are not required. All penetrations through engineered timber to be modelled**
Shaft Openings	ARC	100	A S	100	A S	200	A S	300						
Walls – Loadbearing Openings	-	-	A M S	100	A M S	200	A M S	300						
Walls – Non-Loadbearing Openings	-	-	A M S	100	A M S	200	A M S	300						
Floor penetrations	-	-	A M S	100	A M S	200	A M S	300						Where setout can be frozen at the beginning of Developed Design.
Beam Penetrations	-	-	MEC	100	M S	200	M S	300						STR will model structural component, all setout and detail information by **ARC**.
Penetrations through no post coring zones (Where agreed with Structural Engineer)	A M S	100	A M S	100	A M S	200	A M S	300						If within bound/scope of NZS3604 – **ARC** to design and draw.

MEA Table for Building Projects

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BUILDING SEISMIC RESTRAINTS														
Seismic restraints of services and fitout	BSR	TBC	BSR	TBC	BSR	TBC	BSR	TBC						TBC subject to project scope. BSR LOD levels to be aligned with MEP LOD, e.g. where MEP LOD 200, BSR to be LOD 200 max
Seismic and gravity restraints ((combined) of services – Off site fabricated services 'crates' and risers	BSR	TBC	BSR	TBC	BSR	TBC	BSR	TBC						
Seismic Restraints of services- non complex	BSR	TBC	BSR	TBC	BSR	TBC	BSR	TBC						
Gravity Support of services- non complex	BSR	TBC	BSR	TBC	BSR	TBC	BSR	TBC						
Seismic Restraints (partition, ceiling & FF&E Bracing, Supports etc)	BSR	TBC	BSR	TBC	BSR	TBC	BSR	TBC						
Seismic Restraints (door and partition glazing Opening H-frames)	BSR	TBC	BSR	TBC	BSR	TBC	BSR	TBC						
Seismic Movement Deflection Head (spatial coordination Zone)	BSR	TBC	BSR	TBC	BSR	TBC	BSR	TBC						
Seismic Movement Crush Zones (spatial coordination Zone)	BSR	TBC	BSR	TBC	BSR	TBC	BSR	TBC						

MEA Table for Building Projects

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BUILDING INTERIOR														
Partitions	ARC	-	ARC	100	ARC	200	ARC	300	CON	-				
Internal doors	ARC	-	ARC	100	ARC	200	ARC	300	CON	-				
Ceilings	ARC	-	ARC	100	ARC	200	ARC	300	CON	-				
Balustrading	ARC	-	ARC	100	ARC	200	ARC	300	CON	-				
Furniture	ARC	-	ARC	100	ARC	200	ARC	300	CON	-				
Fixtures	ARC	-	ARC	100	ARC	200	ARC	300	CON	-				
Fittings	ARC	-	ARC	100	ARC	200	ARC	300	CON	-				
Equipment – nonservices	ARC	-	ARC	100	ARC	200	ARC	300	CON	-				
Signage	ARC	-	ARC	100	ARC	200	ARC	300	CON	-				
Speed walls	ARC	-	ARC	100	ARC	200	ARC	300	CON	-				
PASSIVE FIRE														
Passive Fire Protection					PAS	100	PAS	300	CON	-				By FIR or of dedicated PAS protection discipline TBC subject to specific project scope

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MECHANICAL														
Plant external	MEC	-	MEC	100	MEC	200	MEC	200	CON	350				
Plant external – support structure	MEC	-	MEC	100	MEC	200	STR	300	CON	350				To be determined at Developed Design if LOD300 is required during Detailed Design
Plant internal	MEC	-	MEC	100	MEC	200	MEC	200	CON	350				
Plant internal – support structure	MEC	-	MEC	100	MEC	200	STR	300	CON	350				To be determined at Developed Design if LOD 300 is required during Detailed Design
Major Equipment	MEC	100	MEC	100	MEC	200	MEC	300	CON	-				E.g. Chillers, Boilers, internal tanks, Cooling towers or overall plant volumes required
2nd Tier Equipment	-	-	MEC	100	MEC	200	MEC	300	CON	-				E.g. AHUs, Fresh air supply units, Ventilation Fans, Silencers, Pumps & VSDs, Unitary Packaged A/C units, Condensing Units, Air Cooled Chillers & Condensers
Minor Equipment	-	-	-	-	MEC	200	MEC	300	CON	-				E.g. Fan coil units, Hydronic units, VAV terminal units, Ceiling Diffusers, Extract Grilles, Radiators/Heating Units LOD 300 subject to early selection of specific supplier/ configurations as design basis at commencement of Developed Design
Dampers	-	-	-	-	MEC	100	MEC	200	CON	-				Fire dampers, Flexible duct and damper. Requires ARC to tag all fire compartment elements as fire separations to allow automated checking
Duct Lining and Insulation	-	-	-	-	-	-	MEC	200	CON	-				Acoustic Duct Lining, External Duct Insulation
Weather louvres – Architectural Model	-	-	ARC	100	ARC	200	ARC	200	CON	-				Modelled by MEC as well as **ARC** to allow scheduling and performance requirements from model file

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MECHANICAL														
Weather louvres – Mechanical requirements	-	-	-	-	MEC	100	MEC	200	CON	-				Modelled by **MEC** as well as **ARC** to allow scheduling and performance requirements from model file
Major Distribution – Ductwork (in Risers)	MEC	100	MEC	200	MEC	200	MEC	300	CON	-				Spatial block modelling only at concept
2nd Tier Distribution – Ductwork (Main Runs)	-	-	MEC	100	MEC	200	MEC	300	CON	-				
Minor Distribution – Ductwork (Branches)	-	-	-	-	MEC	200	MEC	200	CON	-				
Major Distribution – Pipework in Risers	MEC	100	MEC	200	MEC	200	MEC	300	CON	-				HHW and CHW Pipework >= 50mm diameter and insulation
2nd Tier Distribution – Pipework	-	-	MEC	100	MEC	200	MEC	300	CON	-				HHW and CHW main routes >= 50mm dia. and insulation
Minor Distribution – Pipework	-	-	-	-	MEC	100	MEC	200	CON	-				HHW and CHW Pipework <50mm diameter and insulation
Plant and equipment final pipework and connections <50mm	-	-	-	-	MEC	100	MEC	200	CON	-				
Refrigerant Pipework	-	-	-	-	MEC	100	MEC	100	CON	-				
Flexible pipes	MEC	-	MEC	100	MEC	200	MEC	200	CON	350				LOD 200 Pipework modelled to accurate overall external diameter, with the location accurate to +/-50mm
Controls	MEC	-	MEC	100	MEC	200	MEC	200	CON	-				
Wall mounted sensors and switches	-	-	-	-	MEC	100	MEC	100	CON	-				

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MECHANICAL														
Mechanical Control Centres (MCCs)	-	-	-	-	MEC	100	MEC	200	CON	-				Detail by specialist supplier via Design & Build to achieve specified performance requirements
Flues, fuel supply and storage tanks, and support equipment	-	-	MEC	100	MEC	100	MEC	200	CON	-				Detail by specialist supplier via Design & Build to achieve specified performance requirements
Kitchen Hoods	-	-	ARC	100	MEC	200	MEC	300	CON	-				
Condensate drains	-	-	-	-	-	-	MEC	200	CON	-				
Valves, Flow meters	-	-	-	-	MEC	100	MEC	200	CON					May only be on schematic for 5DD
Registers	MEC	-	MEC	100	MEC	200	MEC	200	CON	350				
Electrical for Mechanical; Traywork – Main routes only	-	-	-	-	MEC	100	MEC	200	CON	-				Minor routes by **CON**
Mechanical services in risers	MEC	-	MEC	100	MEC	200	MEC	200	CON	350				LOD 200 Ductwork modelled to accurate overall external dimensions, with the location accurate to +/-50mm

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ELECTRICAL														
Incoming mains cables	ELE	100	ELE	100	ELE	100	ELE	100	CON	-				With LOD 200 Incoming cable duct from Developed Design stage
Major Equipment	ELE	100	ELE	100	ELE	200	ELE	300	CON	-				E.g. Main switchboards HV & LV
Electrical fixtures	-	-	-	-	A E	200	A E	300	CON	-				Wall elevations/setout by **ARC**
Light switches, power outlets, fixed wired outlets, equipment and machinery outlets	-	-	-	-	ELE	200	ELE	200	CON	-				
Power outlets for health projects – modelled by architect	-	-	-	-	MEC	200	MEC	200	CON	-				Including Medical Services Panels by **ARC**, cleaners outlets by **ELE**
Sub-main cables	-	-	-	-	ELE	200	ELE	100	CON	-				
Distribution boards, UPS racks and panels	ELE	100	ELE	100	ELE	100	ELE	300	CON	-				
Trunking, cable trays, baskets, ladders – Major Routes/ Risers	-	-	ELE	100	ELE	100	ELE	300	CON	-				
Trunking, cable trays, baskets, droppers and ladders >100mm wide	-	-	ELE	100	ELE	100	ELE	200	CON	-				
Cable trays	ELE	-	ELE	100	ELE	200	ELE	200	CON	-				
Lighting	ELE	-	ELE	100	ELE	200	ELE	200	CON	-				
Communications	ELE	-	ELE	100	ELE	100	ELE	200	CON	-				
Security	ELE	-	ELE	100	ELE	200	ELE	200	CON	-				
Controls	ELE	-	ELE	100	ELE	200	ELE	200	CON	-				

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ELECTRICAL														
Light fittings (surface, suspended, recessed)	-	-	-	-	ELE	200	ELE	300	CON	-				Final Setting out by **ARC**
Light control panels	-	-	-	-	ELE	100	ELE	200	CON	-				
Lighting Control Switches/ Dimmers/ Push Buttons/ etc	-	-	-	-	ELE	100	ELE	200	CON	-				Final Setting out by **ARC**
Emergency Egress Lighting and Signage	-	-	-	-	ELE	200	ELE	200	CON	-				Final Setting out by **ARC**
Floor boxes, pedestals and skirting trunking	-	-	ELE	100	ELE	200	ELE	300	CON	-				Final Setting out by **ARC**
External lighting	-	-			ELE	200	ELE	200	CON	-				
In-ground cable ducts	-	-	ELE	100	ELE	100	CIV	200	CON	-				
Lighting control sensors	-	-	-	-	ELE	200	ELE	200	CON	-				E.g. PIR, HF, DT Positions reviewed and confirmed by specialist trade based on actual performance
Modular Wiring Starter Outlets	-	-	-	-	ELE	200	ELE	200	CON					Final Setting out by **ARC**
Electrical services in risers	ELE	-	ELE	100	ELE	200	ELE	200	CON	-				LOD 200 services modelled to accurate overall external dimensions, with the location accurate to +/-50mm

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SECURITY – CCTV, INTRUDER DETECTION AND ACCESS CONTROL														
Control Panels	-	-	SEC	100	SEC	200	SEC	300	CON	-				Final Setting out by **ARC**
CCTV Camera Mounting Brackets	-	-	-	-	-	-	-	-	-	-	-	-		
CCTV Viewing Monitors and Control Devices	-	-	-	-	SEC	200	SEC	200	CON	-				
Client Equipment	-	-	-	-	-	-	-	-	-	-	-	-		e.g. CCTV Network Video Recorders (NVR's)
Cabling	-	-	-	-	-	-	-	-	-	-	-	-		
CCTV Control Devices	-	-	-	-	SEC	200	SEC	200	CON	-				Final Setting out by **ARC**
CCTV Field Switches														
CCTV Equipment Racks	-	-	SEC	100	SEC	200	SEC	200	CON	-				
Intruder Alarm Detection Devices	-	-	-	-	SEC	100	SEC	200	CON	-				
Intruder Alarm User Interfaces	-	-	-	-	SEC	100	SEC	200	CON	-				E.g. Keypads, Touch screens, etc Final Setting out by **ARC**
Access Control User Interfaces (swipe cards, request to exits, break glass, etc)	-	-	-	-	SEC	100	SEC	200	CON	-				E.g. swipe cards, request to exits, break glass, etc Final Setting out by **ARC**
Access Control Locking Devices	-	-	-	-	SEC	100	SEC	200	CON	-				E.g. Maglock, Mortice, Strike, V-lock Typical 2D details and annotation only
Access Control Furniture	-	-	-	-	SEC	100	ARC	200	CON	-				E.g. pedestals, Traffic Barrier Arms, Traffic Control Lights etc. Final Setting out by **ARC**
Door & window interfaces	-	-	-	-	-	-	SEC	100	CON	-				E.g. Auto Doors and Roller Shutter Door, reed switches Typical 2D details and annotation only
Underground Sensor Loops	-	-	-	-	SEC	100	SEC	200	CON	-				

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ICT/COMMUNICATIONS														
Major Equipment	ITS	100	ITS	200	ITS	200	ITS	300	CON	-				E.g. Communications room sizes and Racks
Communications Outlets (RJ45, etc) HEALTH Projects	-	-	-	-	ARC	200	ARC	200	CON	-				All internal walls elevated by **ARC**. Final Setting out by **ARC**
Communications Outlets (RJ45, etc) in specific user briefed rooms and spaces	-	-	-	-	ARC	200	ARC	200	CON	-				Final Setting out by **ARC**
Communications Outlets (RJ45, etc) non user briefed health project spaces and non-health projects	-	-	-	-	ITS	200	ITS	200	CON	-				Final Setting out by **ARC**
Communications (Tray, Basket, Ladder, Ducts, etc) >100mm wide	-	-	ELE	100	ELE	200	ELE	200	CON	-				
Distributors (Building, Floor, Area, Fibre)	-	-	ITS	200	ITS	200	ITS	200	CON	-				
Intercoms	-	-	-	-	ITS	100	ITS	200	CON	-				E.g. Video, Push Button Call, etc.
Final Setting out by ARC	-	-	SEC	100	SEC	200	SEC	200	CON	-				
Intercom Panels	-	-	ITS	100	ITS	200	ITS	200	CON	-				
Consolidation Points	-	-	-	-	ITS	100	ITS	200	CON	-				

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AUDIO VISUAL														
Speakers	-	-	-	-	AUD	200	AUD	200	CON	-				
Amplifiers	-	-	-	-	AUD	200	AUD	200	CON	-				
Racks	-	-	AUD	200	AUD	200	AUD	200	CON	-				
Projectors, Projector Screens, TVs	-	-	-	-	AUD	200	AUD	200	CON	-				
Input Plates (HDMI, L and R, etc)	-	-	-	-	-	-	AUD	200	CON	-				
Interfaces (Touch screens, push buttons , microphones etc)	-	-	-	-	-	-	AUD	200	CON	-				
Assisted Hearing Loops	-	-	-	-	AUD	100	AUD	100	CON	-				
NURSE CALL SYSTEMS														
Nurse Call Devices (Patient stations, Pull Cords and Call Points)	-	-	-	-	NCS	100	ARC	200	CON	-				Detailed Design positioning by **ARC** as part of user briefing process based on **NCS** modelling
Nurse Station	-	-	-	-	NCS	100	ARC	200	CON	-				
Output Devices (Alarm, Speaker, Sounder, Over-door light)	-	-	-	-	NCS	100	ARC	200	CON	-				
Annunciator Panels	-	-	-	-	NCS	100	ARC	200	CON	-				

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
DURESS/ PERSONAL ATTACK SYSTEMS														
User Interface (Push Buttons, DA Strips)	-	-	-	-	SEC	100	ARC	200	CON	-				Detailed Design positioning by **ARC** as part of user briefing process based on **SEC** modelling
Indicator Panels and Indicator lights	-	-	-	-	SEC	100	ARC	200	CON	-				
Output Devices (Alarm, Speaker, Sounder, Beacon)	-	-	-	-	SEC	100	ARC	200	CON	-				
PLUMBING & DRAINAGE														
Sanitary fixtures	PLU	-	PLU	100	PLU	200	ARC	300	CON	350				
Plant	PLU	-	PLU	100	PLU	200	PLU	200	CON	350				
Equipment	PLU	-	PLU	100	PLU	200	PLU	200	CON	350				
Pipework	PLU	-	PLU	100	PLU	200	PLU	200	CON	350				LOD 200 Pipework modelled to accurate overall external diameter, with the location accurate to +/- 50mm
Plumbing & Drainage services in risers	PLU	-	PLU	100	PLU	200	PLU	200	CON	350				LOD 200 Pipework modelled to accurate overall external diameter, with the location accurate to +/- 50mm
Storage Tanks	-	-	PLU	100	PLU	200	PLU	300	CON	-				Tanks within buildings. Refer to sitewide and Civil input for external and buried tanks
Hot & Cold-water supply pipework <=32mm	-	-	-	-	PLU	100	PLU	200	CON	-				
Hot & Cold-water supply pipework >32mm	PLU	100	PLU	100	PLU	200	PLU	200	CON	-				Spatial allowances/zones in concept design.

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
PLUMBING & DRAINAGE														
Hot & Cold-water supply final pipework to fixtures, outlets, incl valves and insulation	-	-	-	-	PLU	100	PLU	100	CON	-				Typically not modelled – specific project agreement where required
Hot water cylinders	-	-	PLU	100	PLU	200	PLU	300	CON	-				
Sanitary fittings, sinks and bowls associated traps and valves	-	-	ARC	100	ARC	200	ARC	300	CON	-				
Floor Wastes – Architectural model for location and set out	-	-	-	-	ARC	200	ARC	300	CON	-				
Floor Wastes – for coordination and connection to drainage system	-	-	-	-	PLU	100	PLU	200	CON	-				
Rainwater gutters, overflows & inlets, External downpipes	-	-	ARC	100	ARC	200	ARC	300	CON	-				Where identified as within PLU scope, otherwise by **ARC**
Rainwater downpipes & lines to external drainage	-	-	-	-	PLU	200	PLU	300	CON	-				Where identified as within PLU scope, otherwise by **ARC**
Soil, waste, overflow and vent piping	PLU	100	PLU	100	PLU	200	PLU	300	CON	-				Where identified as within PLU scope, otherwise by CIV. Spatial allowances/ zones in concept design.
Chemical drains	-	-	-	-	PLU	100	PLU	200	CON	-				
Channels and gratings	-	-	-	-	ARC	100	ARC	200	CON	-				
Inspection chambers, manholes, holding tanks and soak holes	-	-	CIV	100	CIV	100	CIV	200	CON	-				
Pumps (within Building)	-	-	-	-	PLU	100	PLU	200	CON	-				
Septic tanks and grease traps	-	-	-	-	CIV	100	CIV	200	CON	-				All in ground vessels and tanks – outside of building – by **CIV**
Insulation – thermal and acoustic to pipes	-	-	-	-	-	-	PLU	200	CON	-				
Tank restraints/platforms	-	-	-	-	PLU	100	PLU	100	CON	-				Detail by specialist supplier via Design & Build to achieve specified performance requirements
Valves, Flow meters	-	-	-	-	PLU	100	PLU	200	CON	-				May only be on schematic for 5DD

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
FIRE PROTECTION														
Major Equipment	FIR	100	FIR	100	FIR	200	FIR	200	CON	-				e.g. Tanks, pumps and key equip. within sprinkler valve room, inlets, Panels – Fire alarm, LED Mimic, EWIS Detail by specialist supplier via Design & Build to achieve specified performance requirements
2nd Tier equipment – Building Hydrants & test drain, Sprinkler feed	-	-	FIR	100	FIR	200	FIR	200	CON	-				
2nd Tier Equipment – Extinguishers and hose reels	-	-	FIR	100	FIR	200	FIR	200	CON	-				
Minor Equipment – Sprinkler heads (below Ceiling only)	-	-	-	-	-	-	FIR	200	CON	-				
Minor Equipment – Detectors, manual call points, Speakers, strobes, warden intercoms, hold opens	-	-	-	-	-	-	FIR	200	CON	-				
Major services distribution	FIR	100	FIR	100	FIR	200	FIR	200	CON	-				e.g. Pipes from town main to major equip. & to vertical distribution
2nd Tier distribution.	-	-	-	-	FIR	200	FIR	200	CON	-				e.g. Horizontal main routes from risers to all areas of building to connect minor pipes
Minor distribution.	-	-	-	-	-	-	FIR	200	CON	-				e.g. runouts (range pipes) from main routes to points for sprinkler head connection
In Ground Hydrant mains and Hydrants	-	-	FIR	100	CIV	100	CIV	100	CON	-				During Developed and Detailed design, FIR input also needed.
Sprinklers	FIR	-	FIR	100	FIR	200	FIR	200	CON	350				
Extinguishers	FIR	-	FIR	100	FIR	200	FIR	200	CON	350				

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
FIRE PROTECTION														
Pipework (main)	FIR	-	FIR	100	FIR	200	FIR	200	CON	350				LOD 200 Pipework modelled to accurate overall external diameter, with the location accurate to +/-50mm
Pipework (branch)	FIR	-	FIR	100	FIR	200	FIR	200	CON	350				
Detection	FIR	-	FIR	100	FIR	200	FIR	200	CON	350				
Alarm systems	FIR	-	FIR	100	FIR	200	FIR	200	CON	350				
Fire services in risers	FIR	-	FIR	100	FIR	200	FIR	200	CON	350				LOD 200 Pipework modelled to accurate overall external diameter, with the location accurate to +/-50mm
Passive Fire Protection	FIR	-	FIR	100	FIR	200	FIR	200	CON	350				In scope of work of Fire Protection consultant (not Fire Engineering Consultant)

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
MEDICAL GAS SERVICES														
Major Equipment	MED	100	MED	100	MED	200	MED	200	CON	-				e.g. Pumps, Compressors, Receivers, Manifolds, VIE
2nd Tier Equipment – AVSU (Area Valve Service Unit)	-	-	MED	100	ARC	200	ARC	200	CON	-				
2nd Tier Equipment – Outlets, Bollards and Medical Service Panels	-	-	-	-	ARC	200	ARC	200	CON	-				
Minor Equipment	-	-	-	-	MED	200	MED	200	CON	-				e.g. Alarm Panels
Major Services Distribution	MED	100	MED	100	MED	200	MED	200	CON	-				e.g. Pipework from source to riser
Second Tier Services Distribution	-	-	-	-	MED	200	MED	200	CON	-				e.g. Pipework from riser to AVSU
Minor Services Distribution	-	-	-	-	-	-	MED	200	CON	-				e.g. Pipework from AVSU to outlet
SPECIALIST BUILDING SERVICES														
Gases and compressed air services	-	-	PLU	100	PLU	100	PLU	200	CON	-				
Liquids of various types	-	-	PLU	100	PLU	100	PLU	200	CON	-				
Fume extraction systems	-	-	MEC	100	MEC	100	MEC	200	CON	-				
Pneumatic and vacuum tube systems	-	-	-	-	MEC	100	MEC	200	CON	-				
Local refrigeration and cool room installation	-	-	-	-	-	-	ARC	200	CON	-				
Specialists laboratory equipment	-	-	-	-	ARC	100	ARC	200	CON	-				
Pool Water Services equipment and primary pipework	-	-	-	-	PLU	100	PLU	200	CON	-				

MEA Table for Building Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER			COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**Field Verification**	
CONVEYING														
Gantry cranes including support structures, e.g. rails and corbels	ARC	-	ARC	100	ARC	100	ARC	100	CON	-				Detail by specialist supplier via Design & Build to achieve specified performance requirements
Passenger escalators, travellators, goods escalators, and conveyers	ARC	-	ARC	100	ARC	200	ARC	200	CON	-				Detail by specialist supplier via Design & Build to achieve specified performance requirements
Passenger and goods lifts	ARC	-	ARC	100	ARC	200	ARC	200	CON	-				Detail by specialist supplier via Design & Build to achieve specified performance requirements
Dumb waiters	ARC	-	ARC	100	ARC	200	ARC	200	CON	-				Detail by specialist supplier via Design & Build to achieve specified performance requirements

3— LEVEL OF DEVELOPMENT FOR WATER

3.1 MODEL ELEMENT AUTHOR SCHEDULE

The following table assigns responsibilities to Model Elements via an Author and defines the minimum required LOD for Model Elements across the project stages.

Note: if there are two or more disciplines in the MEA Column, the first is the primary owner of the element and second/third is required to coordinate with the first.

Model Element Author Key for Water			
Architectural Consultant	ARC	Fire Consultant	FIR
Structural Consultant *(for all Structural engineering elements refer to Buildings MEA table, section 2.3)*	STR	Civil Consultant	CIV
HVAC & Mechanical Consultant	MEC	Process Consultant	PCS
Electrical Consultant	ELE	Contractor/Sub-contractor	CON
Plumbing & Drainage consultant	PLU	Landscape Architect	LDS

LOD for Water	
100	Conceptual
200	Approximate Geometry
300	Design Specified Geometry
350	Interface Coordination
400	Fabrication and Assembly
FV	Field Verified

3.2 MODEL ELEMENT AUTHOR & LEVEL OF DEVELOPMENT SCHEDULE FOR WATER

Spatial related elements such as site boundaries, grids, levels, zones and spaces are not assigned an LOD because aren't technically elements that are modelled in 3 dimensions. There is a requirement to show them in the table below to make sure that they are assigned an MEA.

The LOD's indicated below are a minimum requirement by the end of each of the design and construction phases noted, the design and/or construction team may choose to implement a higher LOD. For model handover requirements which will be developed during the Construction phase.

MEA Table for Water Projects

3.3 MEA FOR WATER PROJECTS

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		FABRICATION		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
SPATIAL															
Site boundaries, setbacks	ARC	-	ARC	-	ARC	-	ARC	-	CON	FV	CON	FV			To be coordinated between MEA and other design teams during concept design and to be finalised during first two weeks of prelim design.
Grids	ARC	-	ARC	-	ARC	-	ARC	-	CON	-	CON	-			
Building Levels	ARC	-	ARC	-	ARC	-	ARC	-	CON	-	CON	-			
Process Levels	PCS	-	PCS	-	PCS	-	PCS	-	CON	-	CON	-			
Process zones	PCS	-	PCS	-	PCS	-	PCS	-	CON	-	CON	-			
Process spaces, rooms	PCS	-	PCS	-	PCS	-	PCS	-	CON	-	CON	-			
ARC Spaces, rooms	ARC	-	ARC	-	ARC	-	ARC	-	CON	-	CON	-			
ARC zones	ARC	-	ARC	-	ARC	-	ARC	-	CON	-	CON	-			
Process spaces, rooms	PCS	-	PCS	-	PCS	-	PCS	-	CON	-					
ARC Spaces, rooms	ARC	-	ARC	-	ARC	-	ARC	-	CON	-					
ARC zones	ARC	-	ARC	-	ARC	-	ARC	-	CON	-					

MEA Table for Water Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		FABRICATION		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
SITE															
Topography -Existing	CIV	-	CIV	200	CIV	200	CIV	200	CON	-	CON	-			
Site Services Existing	CIV	-	CIV	200	CIV	200	CIV	200	-	-	-	-			
Topography	CIV	-	CIV	100	CIV	200	CIV	300	CON	-	CON	FV			2D CAD or 3D TIN file
Site Water, Stormwater, Sewer	CIV	-	CIV	100	CIV	200	CIV	300	CON	-	CON	FV			1m beyond footprint of buildings
Roading	CIV	-	CIV	100	CIV	200	CIV	300	CON	-	CON	-			2D CAD if appropriate
Road kerb	CIV	-	CIV	100	CIV	200	CIV	300	CON	-	CON	-			2D CAD if appropriate
Surface finishes	CIV	-	CIV	100	CIV	200	CIV	300	CON	-	CON	FV			2D CAD if appropriate
Site Power	ELE	-	ELE	100	ELE	200	ELE	300	CON	-	CON	FV			**CIV** to provide trench input, 2D CAD if appropriate
Site Communications	ELE	-	ELE	100	ELE	200	ELE	300	CON	-	CON	FV			**CIV** to provide trench input, 2D CAD if appropriate
Site lighting	ELE	-	ELE	100	ELE	200	ELE	300	CON	-	CON	FV			
Site Furniture (fences, gates, etc..)	LDS	-	LDS	100	LDS	200	LDS	300	CON	-	CON	FV			
Site landscaping	LDS	-	LDS	100	LDS	200	LDS	300	CON	-	CON	FV			
Plant – Existing	PCS	-	PCS	100	PCS	200	PCS	200	CON	-	CON	-			
Plant – New	PCS	-	PCS	100	PCS	200	PCS	300	CON	-	CON	FV			
Plant – Vendor Supply	PCS	-	PCS	100	PCS	200	PCS	350	CON	400	CON	FV			Will involve importing vendor provided exports which would need to be co-ordinated
Plant – Foundations	PCS	-	PCS	100	STR	200	STR	300	CON	-	CON	FV			PCS-STR Dev. first week

MEA Table for Water Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		FABRICATION		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
SITE															
Plant Ground improvements	CIV	-	CIV	100	STR	200	STR	300	CON	-	CON	FV			CIV-STR Dev. first week
Pipework	PCS	-	PCS	100	PCS	200	STR	300	CON	-	CON	FV			
Pipework Supports	PCS	-	PCS	100	STR	200	STR	300	CON	-	CON	FV			PCS-STR Dev. first week
Pipework fittings, valves, sensors	PCS	-	PCS	100	PCS	200	STR	300	CON	-	CON	FV			
Piping underground encasements	PCS	-	PCS	100	STR	200	STR	300	CON	-	CON	FV			PCS-STR Dev. first week
Plant access structures	PCS	-	PCS	100	STR	200	STR	300	CON	-	CON	FV			PCS-STR Dev. first week
Plant handrailing & gates	PCS	-	PCS	100	STR	200	STR	300	CON	-	CON	FV			PCS-STR Dev. first week
Plant hold down bolts	PCS	-	PCS	100	STR	200	STR	350	CON	-	CON	-			PCS-STR Dev. first week
PENETRATIONS															
For details relating to penetrations (both ARC and STR engineering elements) refer to 2.3 MEA for Buildings															
SUBSTRUCTURE															
For all STR engineering elements, refer to 2.3 MEA for Buildings															
Underground encasements	ARC	-	STR	100	STR	200	STR	300	CON	-	CON	FV			ARC–STR Prelim. first week
Ground improvements	CIV	-	CIV	100	STR	200	STR	300	CON	-	CON	FV			CIV-STR Dev. first week
Pond	CIV	-	CIV	100	CIV	200	CIV	300	CON	-	CON	FV			
BUILDING STRUCTURE															
For all STR engineering elements, refer to 2.3 MEA for Buildings															

MEA Table for Water Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		FABRICATION		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
BUILDING ENCLOSURE															
Architectural Roofing	ARC	100	ARC	200	ARC	300	ARC	300	CON	-	CON	FV			
Cladding	ARC	-	ARC	100	ARC	300	ARC	300	CON	-	CON	-			
Column cladding	ARC	-	ARC	100	ARC	300	ARC	300	CON	-	CON	-			
Curtain walls	ARC	100	ARC	200	ARC	300	ARC	300	CON	-	CON	-			
Windows	ARC	100	ARC	200	ARC	300	ARC	300	CON	-	CON	FV			
External doors	ARC	100	ARC	200	ARC	300	ARC	300	CON	-	CON	FV			
Wall openings – non structural	ARC	100	ARC	200	ARC	300	ARC	300	CON	-	CON	-			

MEA Table for Water Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		FABRICATION		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
BUILDING INTERIOR															
Partitions	ARC	100	ARC	200	ARC	300	ARC	300	CON	-	CON	FV			
Internal doors	ARC	100	ARC	200	ARC	300	ARC	300	CON	-	CON	FV			
Internal openings – non structural	ARC	100	ARC	200	ARC	300	ARC	300	CON	-	CON	-			
Ceilings	ARC	100	ARC	200	ARC	300	ARC	300	CON	-	CON	FV			
Flooring	ARC	100	ARC	200	ARC	300	ARC	300	CON	-	CON	FV			
Balustrading	ARC	-	ARC	100	ARC	200	ARC	300	CON	-	CON	-			
Furniture	ARC	-	ARC	100	ARC	200	ARC	300	CON	-	CON	-			
Fixtures	ARC	-	ARC	100	ARC	200	ARC	300	CON	-	CON	-			
Fittings	ARC	-	ARC	100	ARC	200	ARC	300	CON	-	CON	-			
Equipment – non services	ARC	-	ARC	100	ARC	200	ARC	e300	CON	-	CON	-			
Signage	ARC	-	ARC	100	ARC	200	ARC	300	CON	-	CON	-			
Speed walls	ARC	-	ARC	100	ARC	200	ARC	300	CON	-	CON	-			

MEA Table for Water Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		FABRICATION		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
MECHANICAL															
Plant external	MEC	-	MEC	100	MEC	200	MEC	300	CON	350	CON	FV			
Plant external – support structure	MEC	-	STR	100	STR	200	STR	300	CON	350	CON	FV			MEC-STR Prelim. first week
Plant internal	MEC	-	MEC	100	MEC	200	MEC	300	CON	350	CON	FV			
Plant internal – support structure	MEC	-	MEC	100	MEC	200	STR	300	CON	350	CON	FV			
Louvers	MEC	-	ARC	100	ARC	200	MEC	300	CON	-	CON	-			
Ductwork	MEC	-	MEC	100	MEC	200	MEC	300	CON	350	CON	FV			
Registers	MEC	-	MEC	100	MEC	200	MEC	300	CON	350	CON	FV			
Pipework	MEC	-	MEC	100	MEC	200	MEC	300	CON	350	CON	FV			Minor pipes <50mm dia LOD 200 at Det.
Flexible pipes	MEC	-	MEC	100	MEC	200	MEC	200	CON	350	CON	FV			
Controls	MEC	-	MEC	100	MEC	200	MEC	300	CON	-	CON	FV			
Mechanical services in risers	MEC	-	MEC	100	MEC	200	MEC	300	CON	350	CON	FV			

MEA Table for Water Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		FABRICATION		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
ELECTRICAL															
Electrical fixtures	ELE	-	ELE	100	ELE	200	ARC	300	CON	-	CON	FV			
Power outlets	ELE	-	ELE	100	ELE	200	ARC	300	CON	-	CON	-			
Switches	ELE	-	ELE	100	ELE	200	ARC	300	CON	-	CON	-			
Distribution boards	ELE	-	ELE	100	ELE	200	ELE	300	CON	-	CON	FV			
Cable trays	ELE	-	ELE	100	ELE	200	ELE	300	CON	-	CON	FV			
Lighting	ELE	-	ELE	100	ELE	200	ELE	300	CON	-	CON	FV			
Communications	ELE	-	ELE	100	ELE	200	ELE	300	CON	-	CON	FV			
Security	ELE	-	ELE	100	ELE	200	ELE	300	CON	-	CON	FV			
Controls	ELE	-	ELE	100	ELE	200	ELE	300	CON	-	CON	FV			
Electrical services in risers	ELE	-	ELE	100	ELE	200	ELE	300	CON	-	CON	FV			
PLUMBING AND DRAINAGE															
Sanitary fixtures	PLU	-	PLU	100	PLU	200	ARC	300	CON	350	CON	FV			
Plant	PLU	-	PLU	100	PLU	200	PLU	300	CON	350	CON	FV			
Equipment	PLU	-	PLU	100	PLU	200	PLU	300	CON	350	CON	FV			
Pipework	PLU	-	PLU	100	PLU	200	PLU	300	CON	350	CON	FV			Minor pipes <50mm dia LOD 200 at Det. out to 1m past building footprint
Plumbing & Drainage services in risers	PLU	-	PLU	100	PLU	200	PLU	300	CON	350	CON	FV			

MEA Table for Water Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		FABRICATION		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
FIRE															
Sprinklers	FIR	-	FIR	100	FIR	200	FIR	300	CON	350	CON	FV			
Hydrants	FIR	-	FIR	100	FIR	200	FIR	300	CON	-	CON	-			
Extinguishers	FIR	-	FIR	100	FIR	200	FIR	300	CON	350	CON	FV			
Pipework (main)	FIR	-	FIR	100	FIR	200	FIR	300	CON	350	CON	FV			To 1m beyond building footprint
Pipework (branch)	FIR	-	FIR	100	FIR	200	FIR	300	CON	350	CON	FV			
Detection	FIR	-	FIR	100	FIR	200	FIR	300	CON	350	CON	FV			
Alarm systems	FIR	-	FIR	100	FIR	200	FIR	300	CON	350	CON	FV			
Fire services in risers	FIR	-	FIR	100	FIR	200	FIR	300	CON	350	CON	FV			
Fire stopping elements	FIR	-	FIR	100	FIR	200	FIR	200	CON	350	CON	FV			
CONVEYING															
Cranes	ARC	-	ARC	100	ARC	200	ARC	300	CON	-	CON	400			
Escalators	ARC	-	ARC	100	ARC	200	ARC	300	CON	-	CON	400			
Lifts	ARC	-	ARC	100	ARC	200	ARC	300	CON	-	CON	400			
Structural supports	ARC	-	ARC	100	ARC	200	ARC	300	CON	-	CON	FV			

4— LEVEL OF DEVELOPMENT FOR HV POWER

4.1 MODEL ELEMENT AUTHOR SCHEDULE

The following table assigns responsibilities to Model Elements via an Author and defines the minimum required LOD for Model Elements across the project stages.

Note: if there are two or more disciplines in the MEA Column, the first is the primary owner of the element and second/third is required to coordinate with the first.

Model Element Author Key for HV Power			
Architectural Consultant	ARC	Fire Consultant	FIR
Landscape Architect	LDS	Civil Consultant	CIV
Structural Consultant *(for all Structural engineering elements refer to Buildings MEA table, section 2.3)*	STR	Power	POW
HVAC & Mechanical Consultant	MEC	Transmission Line	TRA
Electrical Consultant	ELE	Contractor/Sub-contractor	CON
Plumbing & Drainage consultant	PLU		

LOD for HV Power	
100	Conceptual
200	Approximate Geometry
300	Accurate Geometry
350	Interface Coordination
400	Fabrication and Assembly
FV	Field verified

4.2 MODEL ELEMENT AUTHOR & LEVEL OF DEVELOPMENT SCHEDULE FOR HV POWER

Spatial related elements such as site boundaries, grids, levels, zones and spaces are not assigned an LOD because aren't technically elements that are modelled in 3 dimensions. There is a requirement to show them in the table below to make sure that they are assigned an MEA.

The LODs indicated below are a minimum requirement by the end of each of the design and construction phases noted, the design and/or construction team may choose to implement a higher LOD. For model handover requirements which will be developed during the Construction phase.

MEA Table for HV Power Projects

4.3 MEA FOR HV POWER PROJECTS

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
ELECTRICAL (BUILDINGS)											
HV Switchboards	-	-	POW	200	POW	300	POW	300	POW	FV	
LV Switchboards	-	-	POW	200	POW	300	POW	300	POW	FV	
Electrical fixtures	-	-	ARC	200	ARC	300	ARC	300	ARC	300	
Power outlets	-	-	ARC	200	ARC	300	ARC	300	ARC	300	
Switches	-	-	ARC	200	ARC	200	ARC	200	ARC	200	
Distribution boards	-	-	ELE	200	ELE	300	ELE	300	ELE	300	
Cable trays	-	-	ELE	200	ELE	200	CON	300	CON	FV	
Lighting	-	-	ELE	200	ELE	300	CON	300	CON	300	
Communications	-	-	ELE	200	ELE	300	CON	300	CON	300	
Security	-	-	ELE	200	ELE	300	ELE	300	ELE	300	

MEA Table for HV Power Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
ELECTRICAL (SWITCHYARD)											
Indoor circuit breakers (CB)	POW	100	POW	200	POW	350	POW	350	POW	FV	Includes Arc Vent Ducts (Arc Chutes) for switchgear
Outdoor circuit breakers (CB)	POW	100	POW	200	POW	350	POW	350	POW	FV	
Disconnecting circuit breaker (DCB)	POW	100	POW	200	POW	350	POW	350	POW	FV	
Voltage transformers (VT)	POW	100	POW	200	POW	350	POW	350	POW	FV	
Capacitive voltage transformer (CVT)	POW	100	POW	200	POW	350	POW	350	POW	FV	
Current transformers (CT)	POW	100	POW	200	POW	350	POW	350	POW	FV	Including Neutral Current Transformers (NCT)
Power transformers	POW	100	POW	200	POW	350	POW	350	POW	FV	
Earthing transformers	POW	100	POW	200	POW	350	POW	350	POW	FV	
Local service transformer	POW	100	POW	200	POW	350	POW	350	POW	FV	
Insulators	POW	100	POW	200	POW	350	POW	350	POW	FV	
Surge arrestors	POW	100	POW	200	POW	350	POW	350	POW	FV	
Natural earthing resistors	POW	100	POW	200	POW	350	POW	350	POW	FV	
Natural earthing reactors	POW	100	POW	200	POW	350	POW	350	POW	FV	
Primary electrical fittings and connectors	-	-	POW	100	POW	350	POW	350	POW	FV	Includes AIS conductors, Busbars, Adaptor Plates, Bus Fittings, Dead Ends, Earthing Horns, jumper terminals, Line Fittings, Spacer clamps, and Transition Plates etc.
Outdoor junction boxes & outdoor cabinets	-	-	POW	200	POW	300	POW	300	POW	FV	

MEA Table for HV Power Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
ELECTRICAL (SWITCHYARD)											
Conductors	-	-	POW	100	POW	300	POW	300	POW	FV	Includes strung and tubular bus
HV cables	-	-	POW	100	POW	300	POW	300	POW	FV	
Cable sealing ends	-	-	POW	100	POW	300	POW	300	POW	FV	
HV cable trays	-	-	POW	100	POW	200	POW	200	POW	FV	

MEA Table for HV Power Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
SITE											
Topography	CIV	100	CIV	200	CIV	200	-	-	CON	300	
Excavation	CIV	100	CIV	200	CIV	300	-	-	-	-	
Stormwater	CIV	100	CIV	200	CIV	300	CON	400	CON	FV	
Wastewater	CIV	100	CIV	200	CIV	200	CON	400	CON	FV	
Control cable trenches			CIV	200	CON	200	CON	200	CON	FV	
Control cable conduits	-	-	CIV	200	CIV	200	CON	200	CON	FV	
Earthing grid	-	-	POW	100	POW	300	POW	300	POW	FV	
Gas pipes	CIV	100	CIV	200	CIV	300	CON	300	CON	FV	
Oil pipes	CIV	100	CIV	200	CIV	300	CON	300	CON	FV	
Comms/Fibre	-	-	CIV	200	CIV	200	CON	200	CON	FV	
Water (mains)	CIV	100	CIV	200	CIV	300	CON	400	CON	FV	
Water (Fire)	-	-	FIR	200	FIR	200	FIR	400	FIR	FV	
Compressed air	CIV	100	CIV	200	CIV	300	CON	400	CON	FV	
Roads	CIV	100	CIV	200	CIV	300	-	-	CON	300	
Parking	ARC	100	ARC	200	ARC	300	-	-	ARC	300	
Footpaths	ARC	100	ARC	200	ARC	300	-	-	ARC	300	
Walls	ARC	100	CIV	200	CIV	300	-	-	CON	300	
Fencing	ARC	100	ARC	200	ARC	300	-	-	ARC	300	
Landscaping	LDS	100	LDS	200	LDS	300	-	-	LDS	300	

MEA Table for HV Power Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
SPATIAL (BUILDING)											
Site boundaries, setbacks	ARC	-	ARC	-	ARC	-	ARC	-	ARC	-	
Grids	ARC	-	ARC	-	ARC	-	ARC	-	ARC	-	
Levels	ARC	-	ARC	-	ARC	-	ARC	-	ARC	-	
Zones	ARC	-	ARC	-	ARC	-	ARC	-	ARC	-	
Spaces, rooms	ARC	-	ARC	-	ARC	-	ARC	-	ARC	-	
SPATIAL (SWITCHYARD)											
Site boundaries, setbacks	POW	-	POW	-	POW	-	POW	-	POW	-	
Site grid	POW	-	POW	-	POW	-	POW	-	POW	-	
Height datum	POW	-	POW	-	POW	-	POW	-	POW	-	
Switchyard	POW	-	POW	-	POW	-	POW	-	POW	-	Separated by voltage, i.e. 110 kV switchyard
Switchyard bays	POW	-	POW	-	POW	-	POW	-	POW	-	
Clearance zones	-	-	POW	-	POW	-	POW	-	POW	-	
Lightning zones	-	-	POW	-	POW	-	POW	-	POW	-	
SUBSTRUCTURE											
Foundations	-	-	STR	200	STR	300	STR	300	STR	FV	
Retaining Walls	-	-	STR	200	STR	300	STR	300	STR	300	
Sub-surface Drainage	-	-	CIV	200	CIV	200	CON	400	CON	FV	

MEA Table for HV Power Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
STRUCTURE											
Floors	ARC	100	STR	200	STR	300	STR	300	STR	300	
Primary Framing	-	-	STR	200	STR	300	CON	400	CON	FV	
Primary Columns	-	-	STR	200	STR	300	CON	400	CON	FV	
Secondary Framing	-	-	STR	100	STR	200	CON	400	CON	FV	
Secondary Columns	-	-	STR	100	STR	200	CON	400	CON	FV	
Pre-cast Concrete Panels	ARC	100	STR	200	STR	300	CON	350	CON	FV	
Pre-cast Concrete Stairs	ARC	100	STR	200	STR	200	CON	350	CON	FV	
Steel Stairs	ARC	100	STR	200	STR	200	CON	400	CON	FV	
Ramps	ARC	100	STR	200	STR	300	STR	300	STR	300	
Load Bearing Walls	ARC	100	STR	200	STR	300	STR	300	STR	FV	
Penetrations – Walls	ARC	100	STR	200	STR	300	STR	300	STR	FV	
Penetrations – Floors	ARC	100	STR	200	STR	300	STR	300	STR	FV	
Fire Walls	ARC	100	STR	200	STR	300	STR	300	STR	FV	
Pole Structures	-	-	TRA	200	TRA	300	CON	400	CON	FV	

MEA Table for HV Power Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
ENCLOSURE											
Roofing	ARC	100	ARC	200	ARC	300	ARC	300	ARC	300	
Concrete Roofing	ARC	100	STR	200	STR	300	STR	300	STR	300	
Cladding	ARC	100	ARC	200	ARC	300	ARC	300	ARC	300	
Column Cladding	ARC	100	ARC	200	ARC	300	ARC	300	ARC	300	
Curtain walls	ARC	100	ARC	200	ARC	300	ARC	300	ARC	300	
Windows	ARC	100	ARC	200	ARC	300	ARC	300	ARC	300	
External doors	ARC	100	ARC	200	ARC	300	ARC	300	ARC	FV	
Penetrations – Non-Structural Elements	ARC	100	ARC	200	ARC	300	ARC	300	ARC	FV	

MEA Table for HV Power Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
INTERIOR											
Partitions	ARC	100	ARC	200	ARC	300	ARC	300	ARC	300	
Internal Doors	ARC	100	ARC	200	ARC	300	ARC	300	ARC	FV	
Penetrations – Non-Structural Elements	ARC	100	ARC	200	ARC	300	ARC	300	ARC	FV	
Penetrations – Load Bearing Walls	ARC	100	STR	200	STR	300	STR	300	STR	FV	
Ceilings	ARC	100	ARC	200	ARC	300	ARC	300	ARC	300	
Flooring	ARC	100	ARC	200	ARC	300	ARC	300	ARC	300	
Balustrading	ARC	100	ARC	200	ARC	300	ARC	300	ARC	300	
Casework, Joinery	-	-	ARC	200	ARC	200	ARC	200	ARC	200	
Fixtures	-	-	ARC	200	ARC	300	ARC	300	ARC	300	
Fittings	-	-	ARC	200	ARC	300	ARC	300	ARC	300	
Furniture	-	-	ARC	100	ARC	200	ARC	200	ARC	200	
Signage	-	-	ARC	100	ARC	200	ARC	200	ARC	200	

MEA Table for HV Power Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
MECHANICAL											
Mechanical Plant	-	-	MEC	200	MEC	200	CON	400	CON	FV	
Valves	-	-	MEC	200	MEC	200	CON	400	CON	FV	
Actuators	-	-	MEC	200	MEC	200	CON	400	CON	FV	
Pipe Fittings	-	-	MEC	200	MEC	200	CON	400	CON	FV	
Pipe Supports	-	-	MEC	200	MEC	300	CON	400	CON	FV	
Louvres	-	-	MEC	200	MEC	200	CON	200	CON	200	
Ductwork	-	-	MEC	200	MEC	300	CON	400	CON	FV	
Registers	-	-	MEC	200	MEC	200	CON	400	CON	FV	
Pipework	-	-	MEC	200	MEC	300	CON	400	CON	FV	
Controls	-	-	MEC	200	MEC	200	CON	400	CON	FV	
MECHANICAL											
Sanitary fixtures	-	-	ARC	200	ARC	300	ARC	300	ARC	300	
Plant	-	-	PLU	200	PLU	300	PLU	300	PLU	FV	
Equipment	-	-	PLU	200	PLU	300	PLU	300	PLU	FV	
Pipework	-	-	PLU	200	PLU	300	PLU	300	PLU	FV	

5— LEVEL OF DEVELOPMENT FOR TRANSPORT AND INFRASTRUCTURE

MEA Table for Transport and Infrastrture Projects

5.1 MODEL ELEMENT AUTHOR SCHEDULE

The following table assigns responsibilities to Model Elements via an Author and defines the minimum required LOD for Model Elements across the project stages.

Note: if there are two or more disciplines in the MEA Column, the first is the primary owner of the element and second/third is required to coordinate with the first.

Model Element Author Key for Transport and Infrastructure			
Architectural Consultant	ARC	Three Waters Consultant	TWA
Civil Structural Consultant	STR	Geotechnical Consultant	GEO
Utilities Consultant	UTI	Landscape Architecture Consultant	LSP
Geometrics/Roading & Civil/Pavement consultant	GMT	Transport Consultant	TRA
Street Lighting Consultant	SLI	Contractor/Sub-contractor	CON

LOD for Transport and Infrastructure	
100	Conceptual
200	Approximate Geometry (partially accurate)
300	Accurate Design Geometry
350	Actual Construction Geometry with Interface Coordination
400	Fabrication and Assembly with Supplementary Components
FV	Field verified

5.2 MODEL ELEMENT AUTHOR & LEVEL OF DEVELOPMENT SCHEDULE

Spatial related elements such as site boundaries, grids, levels, zones, and spaces are not assigned an LOD because they aren't technically elements that are modelled in 3 dimensions. There is a requirement to show them in the table below to make sure that they are assigned an MEA.

The LODs indicated below are a minimum requirement by the end of each of the design and construction phases noted, the design and/or construction team may choose to implement a higher LOD.

MEA Table for Transport and Infrastrture Projects

5.3 MEA FOR TRANSPORT AND INFRASTRUCTURE PROJECTS

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
LANDSCAPING													
Street furniture	-	-	LSP	200	LSP	200	LSP	300					3D. Urban Design-related elements. Accurate Design Geometry
Plantings	-	-	LSP	200	LSP	200	LSP	200					3D. Approximate Geometry (partially accurate)
Existing Trees	-	-	LSP	200	LSP	200	LSP	200					3D Approximate Geometry (partially accurate)
Street Trees	-	-	LSP	200	LSP	200	LSP	300					3D. Accurate Design Geometry
Shelter Structure	-	-	LSP	200	LSP	200	LSP	300					3D. Accurate Design Geometry
Fences	-	-	LSP	200	LSP	200	LSP	300					3D. Accurate Design Geometry
Bus Driver Facility	-	-	ARC	200	ARC	200	ARC	300					3D. Accurate Design Geometry
Shelter Structure	-	-	ARC	200	ARC	200	ARC	300					3D. Accurate Design Geometry
Bus Stops	-	-	ARC	200	ARC	200	ARC	300					3D. Accurate Design Geometry

MEA Table for Transport and Infrastrture Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
GEOMETRICS													
Existing Property Boundaries	-	-	GMT	200	GMT	200	GMT	FV	-	-			3D. Approximate Geometry (partially accurate).
Proposed Designation Boundaries	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Edge & Median Concrete Barriers	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Barrier Transitions (incl. foundations)	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Ridged barriers	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Semi-Ridged barriers	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Kerbs	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Fencing	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Pavement Markings	-	-	GMT	200	GMT	200	GMT	200	-	-			3D. Approximate Geometry
Accessways	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Existing Ground Surface	-	-	GMT	200	GMT	200	GMT	200	-	-			3D. Approximate Geometry (partially accurate).
Road Surface Course (Finished Surface) including shoulders.	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Proposed Ground Surface	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Pathways (Finished Surface)	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Batters (Finished Surface)	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Treatment swale (Finished Surface)	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Conveyance swale (Finished Surface)	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry
Pavement drainage (Subsoil)	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry

MEA Table for Transport and Infrastrture Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
GEOMETRICS													
Embankments	-	-	GMT	200	GMT	200	GMT	200	-	-			3D. Approximate Geometry (partially accurate)
Pavements	-	-	GMT	200	GMT	200	GMT	300	-	-			3D. Accurate Design Geometry. Overall thickness will be modelled.
SIGNALS AND SIGNAGE													
Signages (Gantry)	-	-	TRA	200	TRA	200	TRA	300	-	-			3D Accurate Design Geometry.
Signages (Regulatory, Guidance)	-	-	TRA	200	TRA	200	TRA	300	-	-			3D. Accurate Design Geometry
Signage Foundations (Regulatory, Guidance, Gantry)	-	-	TRA	200	TRA	200	TRA	200	-	-			3D. Approximate Geometry (partially accurate)
Traffic Signal Poles	-	-	TRA	200	TRA	200	TRA	300	-	-			3D. Accurate Design Geometry
Traffic Signal Foundations	-	-	TRA	200	TRA	200	TRA	200	-	-			3D. Approximate Geometry (partially accurate)
Traffic Signal Ducting	-	-	TRA	200	TRA	200	TRA	300	-	-			3D. Accurate Design Geometry
Traffic Signal Pull Pit	-	-	TRA	200	TRA	200	TRA	200	-	-			3D. Approximate Geometry (partially accurate)
Traffic Signal Controller	-	-	TRA	200	TRA	200	TRA	200	-	-			3D. Approximate Geometry (partially accurate)
LIGHTING													
Lighting Poles	-	-	SLI	200	SLI	200	SLI	300	-	-			3D. Accurate Design Geometry
Lighting Pole Foundations	-	-	SLI	200	SLI	200	SLI	300	-	-			3D. Accurate Design Geometry

MEA Table for Transport and Infrastrture Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
STRUCTURAL	-	-											
Foundations	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Structural Concrete Steps	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Concrete Reinforcements	-	-	STR	100	STR	100	STR	100	-	-			3D. Accurate Design Geometry
Concrete Vehicle Barriers	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Pedestrian Barriers	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Handrails	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Pilings	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry. Depths of piles to be confirmed on site.
Permanent Steel Casings	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry. Depths to be confirmed on site.
Pile Caps	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Retaining Walls	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
King Post Retaining Walls and Anchors	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Gabion Walls	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Cantilevered 'L' Shaped Walls	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Soil Nail stabilised Wall	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Facing Panels	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Beams	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry

MEA Table for Transport and Infrastrture Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
STRUCTURAL	-	-											
Trusses (For sign gantry)	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Penetrations in permanent structural elements	-	-	STR	200	STR	200	STR	300	-	-			Accurate Design Geometry. Penetrations in 3D design elements will be modelled accurately for design coordination purposes. Actual location of penetrations to be confirmed on site
Bracings	-	-	STR	200	STR	200	STR	200	-	-			3D. Approximate Geometry (partially accurate)
Ramps	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry
Columns	-	-	STR	200	STR	200	STR	300	-	-			3D. Accurate Design Geometry

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Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
THREE WATERS (POTABLE, WASTE AND STORM)													
Existing Three Water Elements (Applicable Areas)	-	-	TWA	200	TWA	200	TWA	200	-	-			3D. Approximate Geometry (partially accurate). Locations to be confirmed on site by construction teams
Three Water Pipework	-	-	TWA	200	TWA	200	TWA	300	-	-			3D. Accurate Design Geometry
Culverts	-	-	TWA	200	TWA	200	TWA	300	-	-			3D. Accurate Design Geometry
Bioretention Basins	-	-	TWA	200	TWA	200	TWA	300	-	-			3D. Accurate Design Geometry
Stormwater Treatment Filters	-	-	TWA	200	TWA	200	TWA	300	-	-			3D. Accurate Design Geometry
Manholes	-	-	TWA	200	TWA	200	TWA	300	-	-			3D. Accurate Design Geometry
Scruffy Domes	-	-	TWA	200	TWA	200	TWA	300	-	-			3D. Accurate Design Geometry
Catchpits	-	-	TWA	200	TWA	200	TWA	300	-	-			3D. Accurate Design Geometry
Soak Pits	-	-	TWA	200	TWA	200	TWA	300	-	-			3D. Accurate Design Geometry
Cut off Drains	-	-	TWA	200	TWA	200	TWA	300	-	-			3D. Accurate Design Geometry
Rock Riprap (scour protection)	-	-	TWA	200	TWA	200	TWA	100	-	-			3D. Accurate Design Geometry
Valves	-	-	TWA	200	TWA	200	TWA	200	-	-			3D. Accurate Design Geometry
Hydrants	-	-	TWA	200	TWA	200	TWA	200	-	-			3D. Accurate Design Geometry
Thrust Blocks	-	-	TWA	200	TWA	200	TWA	200	-	-			3D. Accurate Design Geometry
Outfall Structure	-	-	TWA	200	TWA	200	TWA	200	-	-			3D. Accurate Design Geometry

MEA Table for Transport and Infrastrture Projects

PROJECT PHASE	CONCEPT DESIGN		PRELIM. DESIGN		DEVELOPED DESIGN		DETAILED DESIGN		CONSTRUCTION		HANDOVER		COMMENTS
Model Element	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	**MEA**	**LOD**	
GEOTECH													
Structural Fill	-	-	GEO	200	GEO	200	GEO	200	-	-			3D. Approximate Geometry (partially accurate)
Landscape Fill	-	-	GEO	200	GEO	200	GEO	200	-	-			3D. Approximate Geometry (partially accurate)
Subsoil Drains	-	-	GEO	200	GEO	200	GEO	200	-	-			3D. Approximate Geometry (partially accurate)
Geotextiles	-	-	GEO	200	GEO	200	GEO	200	-	-			3D. Approximate Geometry (partially accurate)
UTILITIES													
Existing Utilities (Applicable Assets)	-	-	UTI	200	UTI	200	UTI	200	-	-			3D. Approximate Geometry (partially accurate). Locations to be confirmed on site by CON
Cables	-	-	UTI	200	UTI	200	UTI	200	-	-			3D. Accurate Design Geometry
Ducts	-	-	UTI	200	UTI	200	UTI	200	-	-			3D. Accurate Design Geometry
Transformers	-	-	UTI	200	UTI	200	UTI	200	-	-			3D. Accurate Design Geometry
Gas Valves	-	-	UTI	200	UTI	200	UTI	200	-	-			3D. Accurate Design Geometry
Pits/Chambers	-	-	UTI	200	UTI	200	UTI	200	-	-			3D. Accurate Design Geometry
Switch	-	-	UTI	200	UTI	200	UTI	200	-	-			3D. Accurate Design Geometry

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The New Zealand BIM handbook.

This document is one of a suite of documents forming the New Zealand BIM Handbook. You can download or view the remaining documents here:
http://www.biminnz.co.nz/nz-bim-handbook